

Place attractiveness

Citation for published version (APA):

Hooijen, I. (2021). *Place attractiveness: A study of the determinants playing a role in residential settlement behaviour*. [Doctoral Thesis, Maastricht University]. ROA. <https://doi.org/10.26481/dis.20210205ih>

Document status and date:

Published: 01/01/2021

DOI:

[10.26481/dis.20210205ih](https://doi.org/10.26481/dis.20210205ih)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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Place attractiveness

A study of the determinants playing a role in residential settlement behaviour



Inge Hooijen

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A study of the determinants playing a role in residential settlement behaviour

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Published by ROA
Postbus 616
6200 MD Maastricht

ISBN: 978-90-5321-608-8

Printed in the Netherlands by Canon

Place attractiveness
A study of the determinants playing
a role in residential settlement
behaviour

DISSERTATION

to obtain the degree of Doctor at Maastricht University,
on the authority of the Rector Magnificus,
Prof. dr. Rianne M. Letschert
in accordance with the decision of the Board of Deans,
to be defended in public on
Friday February 5, 2021, at 10:00 hours

by

Inge Hooijen

Supervisor

Prof. dr. Frank Cörvers

Co-supervisor

Dr. Christoph Meng

Assessment Committee

Prof. dr. Mark Levels (chairman)

Prof. dr. Ad Knotter

Prof. dr. Dipl. – Ing. Sabine Meier, Universität Siegen

Prof. dr. Ir. Eveline van Leeuwen, Wageningen University & Research

The Traceless Journey

Intellect is a guide; Love is a friend.

Mind is a river you travel; Love is the water of life.

Although there's no trace of the lover's journey in the heavens,
no one reaches there without the signs of journeying.

[Divan-e Shams-e Tabrizi: Quatrain 1098]

(The Rumi Daybook, p. 81)

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1

**The attractiveness of places
Introduction to the dissertation**

1.1 Introduction

Demographic change and the importance of (im)mobility

Most countries and regions are experiencing demographic change. Demographic change is driven by life expectancy, fertility rates and the degree of (im)mobility of people within and between regions and countries.¹ The European Committee of the Regions (ECR) (2020) considers demographic change to be one of the biggest challenges for European regions. The demographic structure and its development affect different fields in society, such as the labour market, the economy, the health care system, the pension system and the environment.

Demographic growth and decline affect countries and regions in different ways. The differences in regional demographic developments lead to an unequal distribution of the population between European regions (ECR, 2020; European Parliament, 2019). The diverse consequences of unequal demographic development for regions add to the debate of policymakers about disparities relating to jobs, income, health, housing, social cohesion and henceforth the attractiveness of places (OECD, 2018a) and are, therefore, of academic concern.

Demographic growth is especially observed around capital and metropolitan regions.² These regions are often characterised by resilient labour markets, diverse economic structures, large sectors (e.g. business services and logistics) and are especially attractive to highly skilled, educated and youthful populations who are in search of favourable economic prospects (ECR, 2020; European Parliament, 2019; Verwest et al., 2017; Florida, 2002b). Much academic research addresses the

1 In migration studies, the distinction between and the use of the concepts of (im)mobility and migration are often blurred and difficult to disentangle because authors use them differently throughout the literature. Mobility is a broader concept, encompassing different movements (e.g. short and long-distance moves, between and within countries, for various time spans and reasons such as a change in residence, business trips, commuting, and tourism), including various forms of migration, whereas migration is often defined as long-distance and long-term moves of at least one year (De Haas, Castles & Miller, 2019; Aybek, Huinink, & Muttarak, 2015; King & Raghuram, 2013; King & Findley, 2012). In this dissertation, the term *(im)mobility* is preferred. However, when reviewing the *migration* literature, the term migration is also used at times in this dissertation. In addition, much research regards immobility as the norm and mobility as an exceptional phenomenon requiring explanation (Carling & Schewel, 2018). In this dissertation, not moving (i.e., immobility) and moving (i.e., mobility) are seen as equivalent options.

2 Capital and metropolitan regions that face demographic decline are recently gaining attention from academics, policymakers and practitioners worldwide (e.g. Ročak, 2020; Van Leeuwen, 2019).

topic of attracting and retaining this particular group and often takes an economic perspective in explaining such (im)mobility flows and almost entirely address settlement behaviour in growing places only (e.g. McCann 2017; Musterd, Bontje & Rouwendal, 2016a; OECD, 2015; Musterd & Gritsai, 2013; Sleutjes, 2013; Glaeser, 2011). The demographic growth in capital and metropolitan regions may also lead to overpopulation and may among other things cause rising housing prices, increasing housing rents and therefore cause polarisation in the society (European Committee of the Regions, 2020; European Parliament, 2019; Florida, 2017). Conversely, other European regions face demographic decline due to an ageing population, low fertility levels and higher rates of out-mobility, with the latter being dominated by the departure of younger cohorts and the more highly skilled (Martinez, Weyman & Van Dijk, 2017; McCann, 2017; Hospers & Reverda, 2015). Such declining regions are among other things often characterised by a decreasing potential labour force, a mono-functional economic structure, reduced economic growth, declining business activity and hence decreasing professional opportunities and relatively higher levels of unemployment. The regions facing demographic decline tend to be rural, already sparsely populated, peripheral, mountainous and post-industrial areas (ECR, 2020; European Parliament, 2019; Verwest et al., 2017).³

Regions facing demographic growth thus tend to have increasing labour productivity and tend to be more attractive regions as more people are inclined to settle down in such areas, whereas regions facing demographic decline seem to fall further behind, with more ageing, a less educated population and the departure of individuals with high human capital.

As a consequence of disparities in demographic growth and decline, population (im)mobility has become increasingly important for expanding or maintaining the population, especially for local governments and regions facing a negative natural population change (i.e. the number of deaths exceeding the number of births) (Thomas, 2018). Population (im)mobility between regions can play a significant role in shaping the demographic composition of regions in the absence of a positive natural

3 Note that other factors that are less predictable, such as climate change and natural disasters, can also impact demographic development (European Parliament, 2019). The outbreak of COVID-19 has been an unexpected event for most. Therefore, many countries imposed nationwide lockdowns and, among other things, announced mobility restrictions. The Netherlands counted a mortality rate of 0.08% in January 2020, which rose by 'only 0.03%' in April 2020, thereby reaching a mortality rate of 0.11%. Immigration rates, however, dropped with no less than 0.08% in April 2020 compared to January 2020 (CBS, 2020). From this perspective, negative demographic development is influenced to a lesser extent by natural population development, compared to the influence of mobility (i.e. immigration), which is due to political decisions. It is important to pay attention to the geographic cluster and demographic features in which, among other measurements, the media environment reports.

population growth. In the context of demographic challenges, the attractiveness of a place becomes more topical than ever when focussed on attracting or retaining people.

Attractiveness of places

Knowledge has become an increasingly important determinant of local and regional development and the people who embody this knowledge (i.e. people with high levels of human capital) are more mobile than ever before (Czaika, 2018). The move towards a knowledge-intensive economy results in an increasing global competition to attract and retain people with high human capital which encouraged many scholars to examine the determinants of these (im)mobility flows (Faggian & McCann, 2009a). 'People in places try to differentiate their place from other places and become more competitive [...] in order to capture or retain capital investment' (Harvey, 1996, p. 298).

This is why the attractiveness of places is increasingly deemed to be of central importance in many local and regional development strategies (Servillo, Atkinson & Russo, 2012). In this dissertation, place attractiveness is defined as the ability of places to attract and retain (new) residents, which is of fundamental importance to local and regional development. The greater the fulfilment of individual preferences in a certain place, the greater the attractiveness (OECD, 2019a; Nedomysl, 2010).

A diverse set of assets can be associated with place attractiveness (De Haas et al., 2019; Servillo et al., 2012). While it used to be thought that place attractiveness, especially in relation to the (im)mobility of human capital (e.g. higher education graduates) was solely dictated by hard locational factors (e.g. employment opportunities and wages) (Kooiman, Latten & Bontje, 2018; Venhorst & Cörvers, 2018; Greenwood, 1985; Sjaastad, 1962), other non-economic factors such as soft locational factors (e.g. quality of life, living environment, the availability of amenities), social factors (e.g. distance to the partner and family) and individual and psychological factors (e.g. age, gender, life-course events, personality traits) have been emphasized in the literature in recent years (Imeraj, Wilaert, Finney & Gadeyne, 2017; Rijnks, Koster & McCann, 2016; Rentfrow, Jokela & Lamb, 2015; Frenkel, Bendit & Kaplan, 2013; Venhorst, 2012; Kley, 2011; Faggian, McCann & Sheppard, 2007; Clark et al., 2002; Florida, 2002b; Glaeser, Kolko & Saiz, 2001).

It is a complex task to precisely identify what makes a place attractive for many reasons. Whether an individual perceives a place as attractive depends on subjective evaluations, different lifestyles and is affected by the individual characteristics (such as age, gender and level of education) (Kley, 2017). Furthermore, it is important to consider the geographical level when contextualizing place attractiveness as some evaluate the choice for a certain place on a local scale (dwelling, street, neighbourhood),

whereas others evaluate their choice of considering a place to be attractive on a larger geographical scale (e.g. local government, region) (Niedomysl, 2010).

Place

Population (im)mobility is an inherent part of how places are defined and operate (Cresswell, 2015). Defining the concept of place is useful as an orientation to understanding the effects of place in particular. In this dissertation, the concept of place is defined by three constructs: 1) a politically defined geographical cluster (e.g. central, peripheral, border regions) consisting of a diverse set of 2) environmental factors (e.g. social, cultural, economic and physical factors) in which 3) individual experiences or collective processes (e.g. perceptions, subjective experiences, social relations, interactions) and the environment mutually reinforce one another. The combination of these three constructs is unique for each place.⁴ This makes the interaction between on the one hand the environment and on the other hand a politically defined geographical cluster, environmental factors and individual experiences or collective processes relevant in understanding local and regional development. The three constructs that define place will be further discussed below.

A politically defined geographical cluster

A place can be characterised by a geographical cluster. A place then refers to a specific location of which the construction is fundamentally a political process (Cochrane, 2012). The direction of research analysis and policy action is influenced by the geographical context in which it occurs and is compared to.⁵ Massey (2004,2005) emphasizes that places are always connected to other places and therefore interdependent, yet nevertheless unique. For example, from a mobility perspective, a geographical cluster becomes part of a system of places with mobility inherent in the relations between the places. Defining a geographical cluster (i.e. accounting for intraregional characteristics) is helpful for better understanding and identifying local

4 The perception of place has changed as the world has become more connected and mobile due to globalisation. From that perspective, one can argue that we live in a borderless society. For an example of place in a mobile world, see Cresswell (2015, pp. 62–84).

5 The mainstream spatial planning approaches are based on growth-oriented paradigms developed based on the experience of successful economic areas. Such an approach is questionable in its effectiveness, because it contributes to stigmatizing areas that differ from the reference category (e.g. Kinossian, 2018; Leick and Lang, 2018).

and regional challenges.⁶ Examples of geographic clusters in this dissertation include the central, peripheral, or border regions.

Environmental factors

Along with its geographic meaning, place is also the setting for environmental factors to develop and transform. All places characterise themselves by unique environmental factors. For example, the place(s) one decides to live in can vary much in terms of economic viability (e.g. spatial division of labour), demographic composition (e.g. the extent of population decline) and physical composition (e.g. mountainous or green spaces). The development and transformation of environmental factors can either be influenced by the environment itself or by people affecting the environment. The environment and people may thus mutually reinforce one another. From this perspective, a place is therefore also inseparably linked with people.

Individual experiences and collective processes

Place then becomes a setting against which so many daily activities and life events occur. This makes places the product of people's perceptions and subjective experiences, as well as the product of social relations, interactions and processes which accumulates through time (Kalantaridis, Bika & Millard, 2019; Gieryn, 2000; Massey, 1995). In so doing, people attach meaning and a sense of (dis)belonging to places which is either the result of individual experiences or collective processes (Kalantaridis, Bika & Millard, 2019). Population (im)mobility in particular may therefore shape the meaning of place attractiveness.

A significant challenge underlying the research on the concept of place is to better understand the ability of places to attract and retain (new) residents by accounting for the interaction between place and all characteristics of the aforementioned three constructs (Williams, 2014).

1.2 Aim of the dissertation

Places differ in the extent to which they experience population ageing, fertility rates and the accumulation or departure of local human capital ((im)mobility flows). Therefore, demographic changes affect places in different ways. This highlights the need for a place-based focus, meaning that local, regional and national governments

⁶ Over the past few years, statistical offices have expanded the range of statistics to cover a diverse set of geographical clusters, thereby recognizing the need of policymakers within the context of cohesion and territorial development policies (European Union, 2019).

should respond according to the specificity of a particular place to develop a customised approach to the characteristics of places (that are related to the politically defined geographical cluster, environmental factors and individual experiences or collective processes), rather than taking a place neutral perspective (Bock et al., 2019; OECD, 2019b; McCann, 2017; Verwest et al., 2017; Fabrizio Barca, McCann & Rodríguez-Pose, 2012). The overriding aim of this dissertation is to create more insight into various factors that are at play in better understanding the attractiveness of places and the ability of places to attract and retain (new) residents.

Four empirical studies in this dissertation are conducted which focus on living preferences, (im)mobility intentions, (im)mobility behaviour and location choice respectively. The dissertation addresses the following primary research questions:

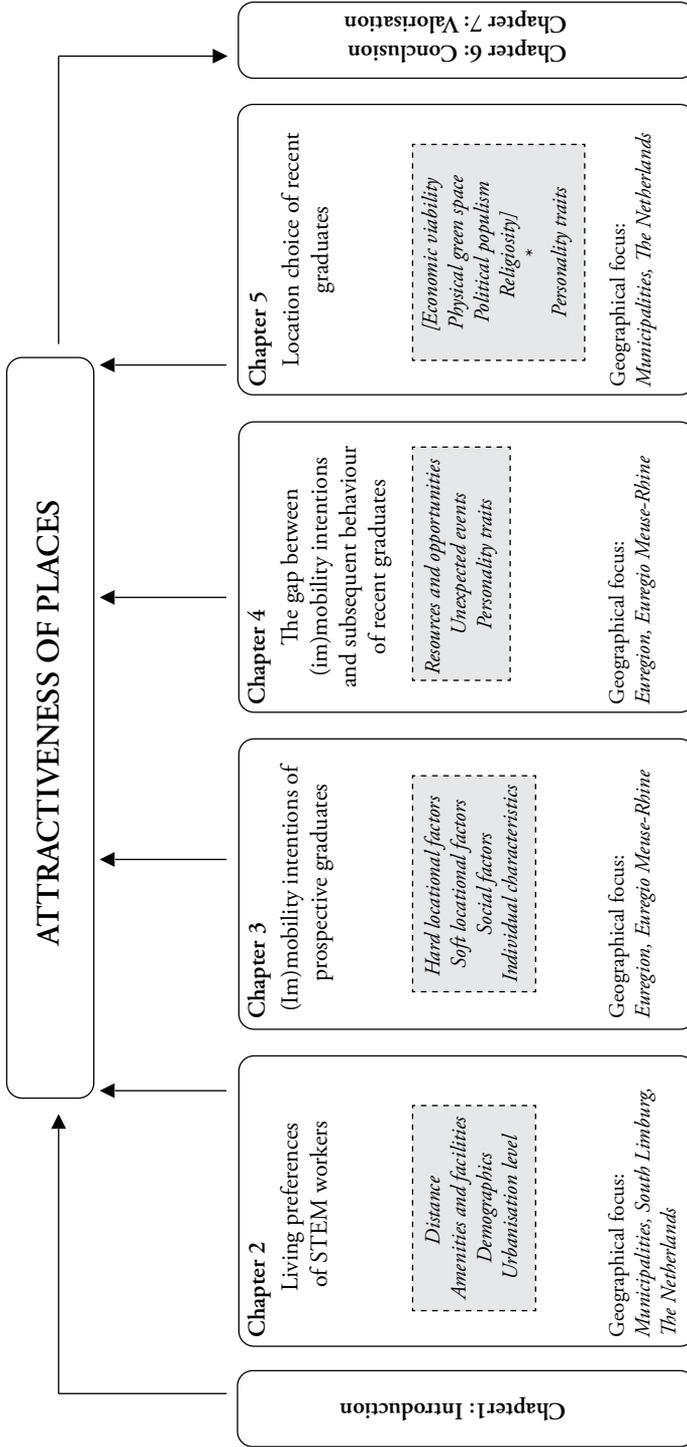
- Chapter 2: What are the living preferences of people occupied in the fields of science, technology, engineering or mathematics (STEM) in a peripheral region in the Netherlands?
- Chapter 3: What determines the (im)mobility intentions of prospective graduates to continue living in the Euregio Meuse-Rhine after graduation?
- Chapter 4: What are the factors explaining the gap between (im)mobility intentions and behaviour of recent higher education graduates in the Euregio Meuse-Rhine?
- Chapter 5: What role do personality traits play in recent graduates' location choice in the Netherlands?

1.3 Outline of the dissertation

Chapter 2 to chapter 5 contain the main body of this thesis. These four empirical studies are written from an interdisciplinary perspective, including the application of mixed methodologies in chapter 2 and 4. Each chapter makes use of different interview, survey or panel data. Chapters 2 to 4 use self-collected data from employees and higher-education graduates. Chapter 5 makes use of an existing and long running survey, the HBO Monitor, which is a large internet-based survey administered among recent graduates from universities of applied sciences in the Netherlands. Furthermore, chapters 2 and 5 merge secondary data on specific characteristics of municipalities of Statistic Netherlands with survey data. Chapter 6 concludes and reflects upon the empirical chapters and chapter 7 discusses the societal contribution of this dissertation.

Figure 1 presents a conceptual framework of all chapters included in this dissertation. The boxes with the dotted lines include the main explanatory variables that form a proxy for place attractiveness in each chapter.

Figure 1.1 Conceptual framework of dissertation



Chapter 2

Chapter 2 explores the residential location choice of people working in science, technology, engineering, and mathematics (STEM) to explore how to attract this scarce target group to a peripheral and demographically changing region in the southernmost part of the Netherlands. We relate the survey data of 420 employees at a high-tech business park to the specific characteristics of the municipalities they live in, and complement the survey data with qualitative data from 32 semi-structured interviews with these workers. This mixed methods study uses the case of a high-tech business park that has undergone a long transformation period from its coal mining days to its biotechnology activities of today. Although substantial research is available on so-called talented persons' residential location choices and their attraction to urban areas, overviews of residential location choices of a more specific group and the attractiveness of peripheral, rural, and suburban places are scarce. We use self-reported overall life satisfaction to explore how satisfied the employees of the high-tech business park are with their residential location choice and the features of the geographical unit in which they reside. Building on an extensive literature on the relations between individuals' life satisfaction and residential location choice, we select a range of individual-specific place variables (e.g. commuting distance, demographic composition of one's municipality) to analyse the impact of these variables on life satisfaction. We assume that the impact of these variables on life satisfaction reveals the living preferences of individuals working in STEM and non-STEM jobs at the high-tech business park.

Chapter 3

Chapter 3 uses survey data from 2015 from different faculties at five higher education institutions and explores the (im)mobility intentions of 1211 prospective graduates, that is, higher education students in the final phase of their studies. Graduates are considered an important source of human capital in today's knowledge-based economy. It is therefore crucial to understand what drives their (im)mobility intentions, to retain and attract larger numbers of graduates. This is particularly true for peripheral regions, which need to compete with economic centres, which are assumed to be more attractive. A substantial strand of literature focuses on human capital migration models in explaining the (im)mobility flows and decisions of (prospective) graduates, often concluding that economic considerations (e.g. labour market opportunities, wages) are a key element in understanding the (im)mobility flows and decisions of (prospective) graduates. This study adopts a more holistic perspective and accounts for the role of hard and soft locational factors, social factors, as well as individual characteristics in shaping future graduates' (im)mobility preferences. In addition, this chapter adds a euregional perspective to the existing literature on graduate (im)

mobility by using the case of the Euregio Meuse-Rhine (EMR), a cross-border region that consists of five sub-regions covering three European countries: the Southern part of the Dutch Province of Limburg, the German Zweckverband Region Aachen, the German-Speaking Community of Belgium, and the Belgian provinces of Limburg and Liège.

Chapter 4

Chapter 4 presents a mixed methods study and investigates the factors explaining the gap between (prospective) graduates' (im)mobility intentions and their subsequent (im)mobility behaviour. This chapter extends the data collection of the chapter 3 by observing the same survey respondents approximately two years after the first survey. We use a sample of 220 recent graduates and complement the survey data with qualitative data from 27 semi-structured interviews to better understand the gap between (im)mobility intentions and behaviour. Research on the relationship between (im)mobility intentions and actual (im)mobility behaviour is scarce as it is initially either focused on the determinants of (im)mobility intentions (i.e. stated preferences) or the determinants of actual (im)mobility behaviour (i.e. revealed preferences). Based on an extensive literature review on the relationship between (im)mobility intentions and behaviour from different disciplines, a conceptual framework is developed, linking (im)mobility intentions and behaviour among three groups of intervening factors: resources and opportunities, unexpected events and personality traits.

Chapter 5

Chapter 5 explores the role of personality traits and the interaction with environmental factors (e.g. economic viability, physical green space, political populism, religiosity) as a potential explanatory factor in better understanding the location choice of recent graduates in Dutch municipalities. While much research on graduate (im)mobility focusses on the role of hard locational factors in explaining location choice, soft locational factors and social factors have received relatively sparse attention. Research on the role of personality traits in location choice is even more scarce. We use a sample of 4500 recent graduates of the HBO-Monitor, a large Internet-based survey administered to recent graduates from universities of applied sciences in the Netherlands. The study explores 1) the extent to which recent graduates in the Netherlands are geographically clustered with respect to five different personality traits, 2) whether the geographical clustering of graduates is intensified as they grow older, 3) how regional environmental characteristics are related to personality traits, and 4) the extent to which personality traits play a role in graduates' location choices.

Chapter 6

Chapter 6 of this dissertation provides a summary of the main findings and reflects upon the methods, data collection and the contributions of this dissertation. It furthermore gives recommendations for further research.

Chapter 7

The last chapter of this dissertation discusses several recommendations for different stakeholders following from this dissertation and gives an overview of the contributions made to policy and practice.

2

Living preferences of STEM workers in a high-tech business park of a peripheral region

This chapter is an extended version of: Hooijen, I., & Cörvers, F. (2020). *Living preferences of STEM workers in a high-tech business park of a peripheral region*. Research Centre for Education and the Labour Market. ROA Research Memoranda, No. 007 doi:10.26481/umaror.2020007

Hooijen, I., & Cörvers, F. (2015). Het aantrekken van kenniswerkers in een krimpgebied. *Rooilijn*, 48(4), 288-295. Retrieved from <http://archieff.rooilijn.nl/download?type=document&identifier=586511>

This chapter is joint work with Frank Cörvers. We thank all the participants in the online survey and all the interviewees who shared their personal stories with us. We extend our gratitude to Martijn van Bussel and his colleagues from buroSTUB, as well as to Sander Dijksman, Ineke Bijlsma, Maja Ročak, Julia Reinold and Jessie Bakens for their cooperation and valuable suggestions. We are also thankful for the comments of Philip Morrison during the Special Session on Regional and Urban Perspectives on Individual Well-Being at the ERSA Conference in Groningen, the comments of Didier Fouarge during the ROA Conference on Human Capital and Regional Development in Maastricht and the comments of the participants at the RSA Conference in Dublin in 2017.

Abstract

Despite the importance of STEM workers to regional economies, scientists and policymakers have a limited understanding of how to recruit this scarce target group, particularly in offering an attractive living environment. This case study uses self-reported overall life satisfaction to explore the relationship between living preferences and residential location choice of STEM workers employed at a high-tech business park (HTBP) in a demographically shrinking region in the southern periphery of the Netherlands. We use individuals' life satisfaction to reveal the preferred features of the geographical unit in which they reside. We relate the survey data of 420 employees at the business park to the specific characteristics of the municipalities they live in, complemented by qualitative data from 32 semi-structured interviews with these workers. We conclude that the average STEM worker at the HTBP prefers to reside in places of lower extraversion, which are often characterized by a suburban lifestyle, green areas, and open spaces, including a little touch of consumer amenities.

Keywords: Residential location choice, life satisfaction, STEM workers, high-tech business park, demographic shrinkage

JEL-codes: J11, O18, R11, R23, R58

2.1 Introduction

Academic and policy interest in attracting and retaining highly skilled and talented people for one's national and regional economy has been growing. Special attention has been paid to creative and knowledge-intensive sectors (Musterd, Bontje & Rouwendal, 2016b). Sometimes, this attention is driven by the aim to revitalize regions challenged by the disappearance of old, often natural resource-intensive industries, such as mining. The disappearance of such industries has profound consequences for a region's economic structure and demographic composition, due to falling employment and demographic shrinkage. Once traditional industries become economically unviable, alternative solutions must be found and new business activities identified (Martinez-Fernandez et al., 2012; Massey, 1995). This chapter explores the residential location choice of people working in science, technology, engineering, and mathematics (STEM), using the case of a high-tech business park (HTBP) in a region that has undergone a long transformation period, from coal mining to biotechnology activities (Jeannet & Schreuder, 2015). The business park is in South Limburg, a peripheral and demographically shrinking region in the southernmost part of the Netherlands.

An extensive portion of the data used in this case study was collected in a project commissioned by the municipalities⁷ surrounding the high-tech business park, as well as by several companies at the business park. The project aimed to better understand the residential location choice of STEM workers, to learn how to attract this target group (Hooijen & Cörvers, 2015). It furthermore supports outlining spatial policies, because the region's changing demographic composition requires a transformation of the current living environment (Province of Limburg, 2016; Van Bussel et al., 2016). South Limburg belongs to one of the main Dutch areas facing population shrinkage, as classified by the Dutch government (Rijksoverheid, 2019), having declined in population by almost 8% between 2000 and 2017. The population loss has been naturally decreasing, with an excess of deaths over births (CBS, 2019a). In the municipalities surrounding the business park – that is, Beek, Stein, and Sittard-Geleen – the population was down 4–7% in 2017 compared to 2000. The population aged 65 and over increased from approximately 14% to a quarter of the population between 2000 and 2017 (CBS, 2018). Due to high mortality and low birth rates, the

7 The following public and private parties contributed to the project conducted by the private urban planning office buroSTUB on the living preferences of STEM workers: the municipalities of Sittard-Geleen, Beek, and Stein; Rabobank Westelijke Mijnstreek; LED2020; Sabc; Stamicarbon; Sitech; Brightlands Chemelot Campus; Holland Expat Centre South; Laudy projectontwikkeling; Royworks Makelaardij; Stimuleringsfonds Creatieve Industrie; the municipality of Venlo; and Océ (Van Bussel et al., 2016). Jointly with buroSTUB we developed the questionnaire.

municipalities in the region face demographic shrinkage of the own population. In contrast, however, there was an incoming immigration surplus in 2018.⁸ The higher number of people moving into the municipalities than the number of people leaving could imply that the region is attractive enough for living and/or work. Although South Limburg's population is declining, its economy is growing, the HTBP being one of the main driving forces of regional economic growth (CBS, 2017). The labour force has not, however, grown at the same pace, because of the demographic composition. The excess demand for STEM workers is therefore expected to increase (CBS, 2017; Bussel van et al., 2016; Hooijen & Cörvers, 2015). Population shrinkage and economic growth can thus go hand in hand.

Much has been written about the impact of research and development and the importance of STEM workers in exploring the drivers of regional development over the past two decades. People working in these fields not only make a vital contribution to regional innovation by generating new ideas, but are also a key driver of employment growth (Winters, 2017; Musterd et al., 2016b; Carnevale, Smith & Melton, 2011; Dahl and Sorensen, 2010; Boschma & Fritsch, 2009; Scott, 2006). In response, a growing body of literature is now focusing on the residential location choice of workers often classified as skilled, highly educated, talented, or creative.⁹ Such studies often treat them as a fairly homogeneous group, whereas they actually constitute a large and diverse group. The studies commonly emphasize an amenity-intensive lifestyle (e.g. with museums, theatres, restaurants) and indicate that such individuals prefer a diverse sociocultural environment (e.g. with ethnic

8 The total net migration increased by 22% for South Limburg comparing 2000 to 2018. Internal migration is still the highest in absolute numbers, yet the number of immigrants settling down in the region has been strongly increasing between 2000 and 2018 (CBS, 2019a).

9 Regardless of peoples' educational background, Florida (2002a, p. 328) divides the creative class into the super-creative core (computer and mathematical, architecture, engineering, life, physical, and social science, education, training, library, arts, design, entertainment, sports, and media occupations) and creative professionals (management, business and financial operations, legal, healthcare practitioners, technical, high-end sales, and sales management occupations). Florida proposes that the creative class is crucial for greater regional economic prosperity. Examples of places with high shares of the creative class are Silicon Valley and Dublin. Fifteen years after *The Rise of the Creative Class* (2002a), Florida published *The New Urban Crisis* (2017), which focuses on how creative economies generate challenges in cities, such as unaffordable housing, inequality, segregation, and gentrification. Florida (pp. 185-216) lays out solutions to these challenges, such as investing in the infrastructure for density and growth (e.g. transit and high-speed rail) and building more affordable housing for the middle class.

diversity, openness, tolerance) and an urban¹⁰ living environment. We refer to such consumption and production hubs as soft locational determinants. An attractive mix of soft locational determinants is, according to studies in the US context, key to not only local urban economic growth (Clark et al., 2002; Glaeser, Kolko & Saiz, 2001), but also in shaping residential location choice (Florida, 2002b). Studies in a European context find that hard locational factors (e.g. employment opportunities) take precedence over soft locational factors as a determinant in residential location choice (Vossen, Sternberg & Alfken, 2019; Musterd & Gritsai, 2013). However, a common argument is that soft locational factors are expected to play a major role in choosing the residential location, once the work location is chosen (Sleutjes, 2013).

Studies about the living preferences of STEM workers are scarce and the results contradict the mainstream literature on residential location choice. Further, the analyses are often based on large geographical units, thus not accounting for intraregional characteristics. Scott (2010) provides evidence for the US and finds that engineers primarily settle in areas where the economic structure and career opportunities correspond to their occupational expertise, and that soft locational factors have no impact. Kotkin (2000) states that workers in technical occupations in the US, such as those employed in high-tech professions in Silicon Valley, prefer residing in suburban environments. Furthermore, Boterman and Bontje (2016) show that technical workers prefer a more suburban residential environment in the Netherlands.

In line with the abovementioned studies, we expect STEM workers to exhibit, on average, a preference for living in suburban environments. This study uses life satisfaction as a dependent variable to approximate the living preferences of STEM workers. The key assumption is that people choose a residential location that provides the highest life satisfaction. Our analysis therefore reveals the preferred features of the geographical unit in which people reside. Within this context, we analyse the role of the distances from home to work and from home to the nearest main road, the match between living preferences and actual residential behaviour, and several municipality characteristics regarding individual life satisfaction. Our aim is to analyse how STEM workers differ from non-STEM workers with respect to residential location choice

¹⁰ The urban milieu has become a dominant area of research in academia and policy. Most studies tend to focus on what makes urban life styles in certain areas attractive as hubs for consumption, creativity, and innovation and as residential places. For policymaking, the mainstream spatial planning approaches are based on growth-oriented paradigms developed based on the experiences of successful economic areas. Such an approach is questionable in its effectiveness, because it contributes to stigmatizing areas that differ from the reference areas. An additional strategy could focus on alternatives to growth-oriented approaches (for further reading, see Kinossian, 2018; Leick and Lang, 2018).

for the case of a HTBP in a peripheral region of the Netherlands. Our analysis is of explorative nature and does not focus on a particular causal effect.

This study applies a mixed method approach. We use information on 25 structured face-to-face interviews, 32 semi-structured telephone interviews, the survey data of 420 workers at the high-tech business park, and geographical data on the specific characteristics of the municipalities to better understand how happy people are with their residential location choice and to reveal the preferred features of the geographical unit in which they reside. We find that the average STEM worker of the high-tech business park, in our case, prefers residing in a place¹¹ with a short commuting distance of less than 25 minutes, with a young, wealthy, and culturally diverse population, without much emphasis on production or consumption hubs. The interview findings confirm the quantitative analysis results and further detail the decision-making process of STEM workers settling in a particular living environment. The results paint an image that corresponds to a suburban living environment. We refer to such an environment as *places of lower extraversion*.¹²

To our knowledge, no studies have yet explored the possible importance that life satisfaction plays in understanding residential location choice of a specific occupational group, such as STEM workers. However, the empirical study of life satisfaction has become a systematic scientific and policy endeavour over the last decades (e.g. Ballas & Tranmer, 2012; Brereton, Clinch & Ferreira, 2008; Dolan & White, 2007). Furthermore, the link of life satisfaction to places has been explored (e.g. Kahneman, Diener & Schwarz, 1999; Easterlin, 1974). Although these (cross)-national studies have stressed the topic of life satisfaction and place (often related to economic indicators), however, relatively few have addressed the impact of life satisfaction on a smaller geographical scale, such as at the municipality level (Bernini & Tampieri, 2019; Ballas & Tranmer, 2012; Morrison, 2011; Shields, Wheatley Price & Wooden, 2009; Brereton et al., 2008; Morrison, 2007; Shields & Wheatley Price, 2005). Our study therefore attempts to decrease the knowledge gap with respect to the impact a place and its characteristics have on individuals' life satisfaction.

This study's results are meaningful for spatial planners and policymakers in a demographically shrinking region. From the perspective of spatial planners, this study sheds light on the residential location choices of STEM workers, emphasizing the importance of studying smaller geographical units in this context (i.e. municipalities). For example, the analysis at the municipality level allows spatial planners to further

11 We define place as a politically defined geographical cluster (e.g. urbanization level, local administrative unit) in which the perceptions, relations, and interactions of people with each other and with the environment are mutually affected (Gieryn, 2000; Massey, 1995).

12 Places of lower extraversion are places that are less vibrant in terms of production and consumption hubs (e.g. lower numbers of businesses and amenities, such as theatres, restaurants, and cinemas), often characterized by less dense places, such as a suburban or rural environment.

explore the local housing market (Van Bussel et al., 2016). Further understanding of the living preferences of STEM workers could also support policymakers in developing the necessary instruments to attract this target group to specific areas and to understand the relation between life satisfaction and the characteristics of the citizens of municipalities and their living environment. The results further emphasize the need for empirical analyses to distinguish between homogeneous groups that are smaller and less diverse. Lastly, since every region is unique and has a different physical environment¹³ and socioeconomic and demographic composition, this study also emphasizes the options to use place-based approaches in proposing policy measures to recruit specific groups of people and offer them interesting career and living perspectives.

The chapter is organized as follows. Section 2.2 describes why life satisfaction is used to better understand residential location choices and explores the literature on the relation between life satisfaction and place. From this literature, we define seven hypotheses regarding the living preferences of STEM workers. Section 2.3 details the study area and the empirical strategy. Section 2.4 discusses the empirical results of both the quantitative and qualitative analyses. Section 2.5 concludes the chapter.

2.2 Identifying the relation between life satisfaction and place

We use life satisfaction to explore how happy people are with their residential location choice. Life satisfaction relates to an individual's overall cognitive evaluation of satisfaction¹⁴ with life and is an indication of personal subjective welfare (OECD, 2018b; Veenhoven, 2012; Diener et al., 1999). "Where we live affects how we feel" (Ballas, 2013, p.40). Furthermore, we use individuals' level of life satisfaction to reveal their preferred location and the features of the geographical unit in which they reside. This is based on the assumption that individuals settle down in an environment they consider most desirable and attractive (Faggian, Olfert & Partridge, 2012). The choice of a particular residential location therefore becomes key for individuals in finding a geographical area that best fits their preferences and thus fulfils their desires (Kahneman et al., 1999; Sjaastad, 1962; Tiebout, 1956). This does not suggest that all explanatory variables have an unambiguous effect on life satisfaction, since it is often an interplay of different factors that fulfil individuals' desires (Faggian, Olfert & Partridge, 2012).

13 The physical environment includes the land, air, water, plants and animals, buildings, and other infrastructure (Ministry of Social Development, 2003).

14 Concepts related to life satisfaction are happiness, well-being, and quality of life. Previous research suggests conceptual overlap between these concepts (see also Medvedev & Landhuis, 2018; Veenhoven, 2012).

Our analysis builds upon empirical evidence on the relation between life satisfaction and the residential location choice of individual STEM workers. We next formulate hypotheses on the preferences of (STEM) workers based on empirical studies on their life satisfaction, and residential location choice.

Commuting Distance

The first indicator we explore is the role of distance to work in relation to life satisfaction. Research also shows that the proximity (measured in distance or travel time) of the residential location to location-specific factors, such as all kind of amenities, affects life satisfaction. Therefore, commuting is associated with costs and benefits. A body of research indicates a negative impact of commuting on life satisfaction and conclude that commuting is a costly activity due to direct monetary costs (e.g. expenses for travel) and high opportunity costs (e.g. less time for leisure activities) (Ingenfeld, Wolbring & Bless, 2019). However, established in classical urban location theory, commuting is also associated with benefits: “People benefit from commuting when it allows them to get to an office or a factory in order to supply their work, or when they can find either superior or cheaper housing, albeit at a greater distance from work. Individuals take these benefits [...] into consideration when they make decisions on where to live, where to work and how to commute” (Stutzer and Frey, 2008, p. 343). There are conflicting results on the impact of commuting on life satisfaction, yet the majority of studies seem to point to a negative effect of commuting on individuals’ life satisfaction. However, the results of these studies call for caution as the specification of different distance categories and the type of transportation has implications for the results (Ingenfeld, Wolbring & Bless, 2019). Stutzer and Frey (2008), using panel data on subjective well-being in Germany, find commuting time to have a negative effect on life satisfaction. A study using a Canadian sample (Hilbrecht, Smale & Mock, 2014) reports similar outcomes. Ingenfeld, Wolbring and Bless (2019) find a negative effect of commuting on life satisfaction when the commuting distance exceeds 80 kilometres. The study by Kahneman et al. (2004) show that people derive the lowest satisfaction from commuting, compared to the satisfaction derived from other daily activities, such as exercise or housework. Although Lorenz (2018) finds no evidence that longer commuting distances (50 km or more) lower overall life satisfaction in Germany, the author finds lower levels of life satisfaction within certain life domains, particularly family life and leisure. Olsson et al. (2013) find a positive association between life satisfaction and commuting time in different urban areas in Sweden. This is because it is more common to cycle or walk from home to work in Sweden, which contributes to satisfaction, rather than drive or use public transport. In addition, for the Netherlands, Boterman and Bontje (2016) show that technical workers value shorter commuting distances more than creative workers (those working in media, advertising, and social sciences jobs) and other higher-educated workers. Frenkel,

Bendit & Kaplan (2013) find that workers employed in high-tech industries in Tel Aviv prefer residing close to their workplace as the morning peak-hour commuting time by car to the workplace is negatively correlated to workers residential location. Dahl and Sorensen (2010) find that Danish technical workers value proximity to their current and previous residence and proximity to their social network more than economic factors when considering where to work.

Empirical studies generally find that the impact of distance on life satisfaction is negative; for STEM workers, we expect the negative impact of the commute distance (HI) to be stronger than average.

Access to amenities and facilities

We next explore the role of (accessibility to) amenities and facilities. We argue that individuals are expected to settle in an environment considered they find the most desirable and attractive. In recent years, a growing number of studies – especially those focusing on the American context – has suggested that amenities such as theatres, restaurants, nightlife, and entertainment play an important role in attracting people (Clark, 2002; Florida 2002a, 2002b; Glaeser, 2001). This indicates that workers selectively choose a residential location that is favoured with relevant amenities. Musterd and Gritsai (2013) and Sleutjes (2013) find that amenities such as proximity to natural environment seem to be less important to knowledge workers in Europe than in the US. Sleutjes (2015) finds it plausible that amenities play a role once a work area has been chosen. Brereton et al. (2007) use proximity measures to examine if the influence of spatial amenities on life satisfaction is a function of distance. For example, they find that the impact of the spatial amenity (close proximity to a major road, less than 5 km), has a negative impact on life satisfaction on individuals in Ireland. For the Netherlands, Boterman and Bontje (2016) show that (urban) amenities, such as restaurants and museums, are less important for technical workers than for creative workers and other higher-educated workers. Scott (2010) finds that amenities do not play a role in the location choice of engineers in the US. In our analyses, we measure in particularly two different types of amenities and facilities and the accessibility to them. First, the distance from one's municipality to the first major road. Second, amenities and facilities (e.g. the average number of as restaurants food delivery services in a municipality and the number of business establishments in a municipality). Based on the literature, we expect the two types of amenities and facilities to have different effects.

First, we expect closer proximity to the amenity major road to have a negative impact on life satisfaction for both STEM and non-STEM workers (H₂)
Second, we expect the number of amenities to not impact life satisfaction for STEM workers as much as for other workers (H₃).

Local average income

The third indicator we focus on is the role of regional or local average income in individual life satisfaction.¹⁵ Growing emphasis is placed on geography as an explanatory factor for happiness and income. Knies, Burgess & Propper (2007) find a positive correlation between neighbourhood incomes and subjective well-being in Germany. Their study furthermore indicates that the better off the average neighbour, the happier people are. Similar findings are reported by Clark, Westergård-Nielsen & Kristensen (2009) using Danish data. Dittmann and Goebel (2010) furthermore show that, in Germany, life satisfaction increases with the neighbourhood's socioeconomic status. Knies (2011) finds that people who are changing residence value living in richer neighbourhoods. A potential explanation for this is that a richer neighbourhood is reflected by higher-quality services and more and diverse local amenities and visible consumer goods, such as the types of cars parked on the streets. Greater spending can also simultaneously contribute to an economically flourishing municipality. Therefore, a municipality's higher average income could explain its higher quality of life. As far as we know, empirical studies on the relation between average local income and life satisfaction have not differentiated between STEM and non-STEM workers.

Hence, we expect life satisfaction to increase if the municipality's average income is higher for both STEM and non-STEM workers (H₄).

Cultural diversity

We further explore the impact of local cultural diversity on life satisfaction. "[...] local communities are becoming more diverse [...], with unclear consequences on the well-being of people living in these communities" (Longhi, 2014, p. 1). There are opposing arguments for the desirability of a diverse society. Arguments against are that diversity lowers social capital, creates different perceptions, lowers trust, and limits the possibility of speaking the language of the host country, which can increase social conflict and thus negatively impact life satisfaction. Arguments supporting diverse societies point to positive increases in social cohesion and social

¹⁵ A body of research shows that individuals evaluate their life more positively the more income they have, also taking into account how this income compares to that of others (Knies, 2011; Easterlin, 2001).

capital, employment, productivity, wages, and consumer utility, such as the amount of (ethnic) amenities and facilities (e.g. shops and restaurants). Therefore, culturally diverse societies can also have a positive impact on life satisfaction (Akay, Constant & Giulietti, 2014; Longhi, 2014, Bakens, Mulder & Nijkamp, 2013). Florida (2002b) and Florida and Gates (2001) find a positive relation between diversity (among other factors measured by the percentage of ethnic groups and homosexual people in a region) and the concentration of high-tech industries. These findings indicate that individuals with high levels of human capital (defined as having a bachelor's degree and above) are attracted to places scoring high in diversity and that regional innovation and economic growth are positively related to diversity.

Although the literature on cultural diversity and life satisfaction is limited, we expect STEM workers living in areas with greater cultural diversity to have higher life satisfaction (H5).

Ageing and population decline

Alongside internal mobility, international migration, and low birth rates, demographic change has involved a rising number of the elderly. Demographic change produces complex challenges because of its socioeconomic implications. These challenges point to the structure of the working age population (i.e. shrinking working-age population), local amenities (e.g. disappearance of shops) and services (e.g. disappearance of ATMs and post offices) and health and social welfare systems, as well as the attractiveness of a place (OECD, 2013, 2014). Ageing can have an impact on different aspects of society. Citizens in different life stages are likely to differ in many ways, because they might not identify with each other or could have conflicting interests. These differences could, for example, be expressed in terms of generations and political perceptions. Whereas younger generations might value political and social change and the integration of new technologies, the elderly can be more conservative. Such differences can lead to heterogeneity in the interests of younger and older citizens in a certain area and arguably push young people of working age away from areas with many retirees, to maximize their well-being elsewhere (Mannheim, 1936). For the US, Glaeser (2016) find lower levels of self-reported well-being in cities with a declining population in 2000 than in other cities; however, individuals in these declining cities also appear to have been unhappy in the past (in 1940). In addition, Delken (2008) finds that, in Germany, whether people live in a city with a shrinking¹⁶ or a growing population does not matter for life satisfaction. Population decline and ageing are topics that have received relatively sparse attention in regional science (McCann,

¹⁶ Delken (2008) defines shrinking and growing cities, respectively, as those facing a population decrease or increase of 3% or more from 1990 to 2005.

2017). This also points to a gap in understanding the impact of ageing and/or a declining population on the overall life satisfaction of individuals in a certain area.

Hence, we expect both STEM and non-STEM workers to have lower life satisfaction in areas with higher numbers of elderly, that is, those past the age of retirement age (H6).

Urbanization level and population density

Studies on the effect of population density on life satisfaction show various outcomes. Florida, Mellander and Rentfrow (2013) find that denser places are correlated with lower levels of happiness, when controlling for wages. The same is true for Sørensen (2014), who, using data from the European Values Study (2008), finds higher life satisfaction among European rural dwellers than among city dwellers, regardless of living in a poorer or richer Member State. However, Shucksmith et al. (2009) find only small rural–urban differences in the quality of life in richer European countries such as Denmark, Luxembourg, and the Netherlands, slightly in favour of rural areas. With regard to STEM workers, Kotkin (2000) concludes that workers in technical occupations in the US, such as high-tech professions in Silicon Valley, prefer residing in locations other than dense urban areas. Boterman and Bontje (2016) find that technical workers in the Netherlands prefer a more suburban environment to live in, compared to other higher-educated workers, whereas workers in creative industries are more likely to opt for urban environments.

We expect life satisfaction to drop more for STEM workers than for non-STEM workers as population density or urbanity increases (H7).

2.3 Methodology and data

2.3.1 Study area

This paper is based on a study conducted on behalf of various local governments and public and private institutions in South Limburg to explore the residential location choice of STEM workers. South Limburg¹⁷ is in Limburg Province, in southeast

¹⁷ South Limburg is one of the 40 Dutch Nomenclature of Territorial Units for Statistics (NUTS-3), also known in the Netherlands as Coördinatiecommissie Regionaal Onderzoeksprogramma (Coordination Commission Regional Research Programme, or COROP) regions. The NUTS classification is used to divide the economic territories of the European Union to collect and produce regional statistics (Eurostat, 2019).

Netherlands (see Figure 2.1), bordering Belgium to the southwest and Germany to the east. South Limburg is a peripheral region from a Dutch perspective, but it can be considered a central region from a European perspective. South Limburg is near several larger European cities: Brussels and Antwerp, in the west, and Düsseldorf and Cologne, in the east, are all less than 125 km away, compared to central areas of the Netherlands, which are over 200 km away.

Figure 2.1 Location of South Limburg (NUTS-3) in the Netherlands



South Limburg was once a prosperous area servicing 12 mining sites (eight privately operated) between the beginning of the 20th century and the beginning of the 1960s (Langeweg, 2011). In 1965, the Dutch government decided to shut down the mining operations because it was no longer economical to continue. After dissolution of the coal mines, South Limburg faced the decline of its major economic sector of production and employment. A decade after the mine closures, the employment rate for South Limburg had decreased by 15%, whereas it had increased by 4% for the Netherlands overall. During the same period, the population grew¹⁸ only 6% in South Limburg, compared to 13% for the entire Dutch population (Soeters, Spoormans &

¹⁸ From the start of the mining industry in 1899 to a few years after the mine closures, the population in the entire province of Limburg quadrupled, growing faster than the average Dutch population. For the western mining area in South Limburg, 19.5% of the population growth was due to positive net migration, and 80.5% was due to natural population increase from the end of the 19th century to the mine closures in 1965. The high rate of natural increase was the result of 1) high fertility rates influenced by the Catholic doctrine and 2) a relatively young population. For example, 45% of the population in the entire province was aged 20 years or below in 1930 (CBS, 2017; Langeweg, 2011).

Welten, 1990). South Limburg¹⁹ began facing negative population growth at the end of the 1990s. The region now belongs to one of the main Dutch areas facing population shrinkage as classified by the Dutch government (Rijksoverheid, 2019). However, demographic shrinkage does not necessarily mean economic shrinkage. For example, economic growth in South Limburg peaked in 2015 (3.6%) and surpassed the Dutch average of 2.3%. This growth has been mainly due to the industrial (no construction), energy, and manufacturing sectors²⁰ in the western part of South Limburg (CBS, 2017). Although demand for STEM workers has therefore been increasing, the labour force has not been growing at the same pace (CBS, 2017).

Our specific area of study is a former coal mine in the western part of South Limburg. Operated by the Dutch State Mines, established in 1902, this mine has since become one of the largest²¹ (800 hectares) and most sustainable chemical sites in Europe today (Chemelot, 2018). Dutch State Mines already diversified into chemical activities by opening its first coke plant in 1919, decades before closing its first mining shafts. Sustainable products and materials such as lightweight materials for the automotive industry or anti-reflective coatings for solar panels are currently being developed at the site (Chemelot, 2018). The industry at the site strategically turned into one of the Netherlands' six important open innovation campuses, where students, researchers, and entrepreneurs from various industry firms form a community for the exchange and exploitation of knowledge. The industry firms interact with universities and local governments in a triple helix approach, which is based on the view that collaboration between these three actors is crucial for the development towards a stronger, sustainable knowledge economy (Etzkowitz & Leydesdorff, 1997).²²

19 The extent of demographic change varies between municipalities in South Limburg. The population declined (by 4–10%) in all 18 municipalities from 2000 to 2017. However, the population increased in four municipalities (by less than 1%) and remained relatively stable in four other municipalities (decreasing less than 0.05%) between 2016 and 2017. The majority (75%) of the eight municipalities with an increasing or stable population size are classified as rural areas (CBS, 2018).

20 The sector is divided into mining and quarrying, manufacturing, electricity and gas supply, water supply, and waste management (CBS, 2017).

21 The industrial park counts 60 plants, 150 organizations, and 8,000 employees of 100 nationalities. Furthermore, it has 50 km of road, 60 km of rail, two land harbours, a rail terminal, 800 km of overhead electrical lines, and 150 km of sewer pipes (Chemelot, 2019). In addition, the HTBP (Brightlands Chemelot Campus) has the ambition of growing from 50 high-tech companies, 1,700 knowledge workers, and 600 students in 2015 to a minimum of 100 high-tech companies, 3,100 knowledge workers, and 1,000 students by 2023 (Chemelot, 2016).

22 The Brightlands Chemelot Campus HTBP is one of the four campuses – the others being the Brightlands Maastricht Health Campus, the Brightlands Smart Services Campus, and the Brightlands Campus Greenport Venlo – in the region under the umbrella name Brightlands.

2.3.2 Spatial unit of analysis and spatial policy objectives

Municipalities²³ are the spatial unit of analysis in this study. From a regional perspective, Dutch municipalities are considered relevant geographical units to analyse, since they maintain significant power in determining land-use policies (OECD, 2017). The 18 municipalities in the region of South Limburg have developed a joint view of the housing market and the spatial layout of the region called *Structure Plan South Limburg*. Structure Plan South Limburg is the main governmental document outlining the spatial policy objectives and the policies pursuing them. The purpose of this joint view is to expand South Limburg as a knowledge region and create an attractive living environment, including a well-functioning housing market. The main vision involves regional (housing) consolidation, which includes reprogramming the dwellings and residential areas for adaptive reuse. This reuse is determined by a combination of vacancy rates in the housing stock and the municipality's expected population development (Province of Limburg, 2016). The results of the project on the residential location choice of STEM workers were used as input to outline the spatial policies in the Structure Plan South Limburg. The results are of interest for municipalities, because a changing demographic composition will require transformation of the current housing stock and living environment, such as a shift from family homes to more single-person households, homes for the elderly, and more sustainable dwellings (Van Bussel et al., 2016). Furthermore, the results are of interest for the companies at the HTBP regarding attracting STEM workers (including their partners or families) by offering an attractive living environment in addition to employment. We nevertheless acknowledge that an analysis on a more detailed geographical level, such as on the neighbourhood or street level, would be more appropriate since e.g. amenities and the demographic composition, might vary a lot within a municipality (Van Bussel et al., 2016, pp. 65-98). The sample size does however not allow to run analysis on a lower geographical level than the municipality level. We aim to limit this drawback by doing semi-structured interviews that provide

Brightlands is a joint triple helix initiative of Limburg Province, Maastricht University, Maastricht University Medical Center+, Zuyd University of Applied Sciences, and Fontys International Campus Venlo, in close partnership with leading companies in specific market areas (Brightlands, 2019). For further reading on the campus development in Limburg Province, see also Kooij (2015, pp. 73–84). Furthermore, partly financially supported by Limburg Province, Kennis-As Limburg is a collaboration between the university and the university of applied sciences in the region, aimed at strengthening the region's social and economic structure. Their projects are multidisciplinary and include different actors in, for example, trade and industry (Maastricht University, 2019).

23 Municipalities are equivalent to local administrative units and are a subdivision of the NUTS-3 classification (Eurostat, 2019).

greater meaning to the results of the survey data. This is discussed in the following section.

2.3.3 Methodology and data collection

This study employs a mixed method approach, and we complement the data from an online survey with interview data to generate multiple-sourced information. We use a mixed method approach for triangulation, because this involves the convergence, corroboration, and correspondence of the results from the online survey and the interviews. The approach also involves complementarity, since it seeks to elaborate, enhance, illustrate, and clarify between the qualitative and quantitative results (Greene, Caracelli & Graham, 1989). The advantage of using both quantitative and qualitative methods is that it provides a better understanding of the relation between life satisfaction and living preferences and its interaction with the characteristics of the residential location (i.e. triangulation). Furthermore, the interviews add complementary information about employees' motivations and interpretations in the context of residential location choice. They also provide greater meaning to the results of the survey data by adding contextual and detailed insights to the results of the quantitative analysis, for example, by including illustrative quotes from the interviews (O'Leary, 2010). With some exceptions (Musterd & Gritsai, 2013; Sleutjes, 2013; Florida, 2002a), most research on residential location choices and, more specifically, on the residential location choices of STEM workers is based on quantitative methods. Thus, by applying a mixed method approach, we aim to further confirm our hypotheses and gain greater comprehension of our research, including the empirical relevance of our models (Creswell & Plano Clark, 2011; Greene et al., 1989).

In addition, we use a sequential design that starts with explorative fieldwork, followed by the online survey. Exploratory fieldwork was conducted prior to the main data collection to inform the choice and development of the research methods and content for the subsequent empirical study (Babbie, 2008). The online survey precedes the interviews. The quantitative and qualitative components are brought together in the results, in Section 2.4, referred to by Morse and Niehaus (2009) as the results point of integration. The interview results are added and integrated down the results of the regression analysis. We use similar categories (distance, amenities and facilities, local average income, cultural diversity, ageing and population decline, and urbanization level and population density) for both data analyses in Section 2.4.

Exploratory fieldwork

In 2015, at the campus site, buroSTUB²⁴ conducted 25 short structured face-to-face interviews, in either English or Dutch, with employees from the high-tech business park, before implementation of the online survey. Convenience sampling is used for the face-to-face interviews, since the sample is drawn from employees close at hand at the business park (Babbie, 2008). During these interviews, the employees were asked four questions about their living environment: 1) Where do you live? 2) Why did you choose to live there? 3) How do you feel living in this region? 4) Do you miss any amenities or facilities in your living environment that you consider important?

Online survey

Next, on the basis of exploratory fieldwork and a literature review, we developed an online survey to identify the residential location choice of the STEM and non-STEM workers employed in several companies at the high-tech business park. The online survey was developed in collaboration with two researchers from Maastricht University and four spatial planners. The questionnaire was tested for its overall intelligibility and to measure completion times before the survey's official distribution. Online surveys can be completed quickly and give respondents the opportunity to answer at their most convenient times. The communication advisor of the HTBP arranged the survey participation with different companies at the HTBP. First, cluster sampling is used so that individuals within these clusters (i.e. HTBP) can be surveyed. Second, stratified random sampling is used, which involves dividing the population into various subgroups and then taking a simple random sample within each one, thereby ensuring that the sample represents key subgroups of the population at the HTBP (O'Leary, 2010; Babbie, 2008). The survey was randomly distributed via the communication departments of several companies at the business park by a direct email invitation that included a link to the digital questionnaire. A total of 1,533 employees received the invitation, and the survey data, collected between April 2015 and April 2016, includes information on 420 individuals (i.e. a 27% response rate). We face two potential errors in this approach for which we cannot control. First, coverage error, which occurs when the target population does not coincide with the population actually sampled. Second, non-response bias, which occurs when the characteristics of those who accept and those who decline participation are distinct (O'Leary, 2010; Babbie, 2008). Another error is that we do not have an overview of the exact number of employees at the HTBP. Therefore, we cannot give a precise indication of the representativity of the sampled population.

²⁴ buroSTUB is a design agency specialized in urban design and the design of public spaces.

Secondary data

In addition to the survey data, we incorporate data on specific municipality characteristics to attach greater meaning to the residential location choices of the respondents (see also Section 2.3.4). We merge our survey data with data on the district and neighbourhood maps published by Statistics Netherlands in 2015 (CBS, 2016a). We consider these variables relatively consistent over time, and, therefore, the municipality's appeal – for example, land use or amenities such as bars and restaurants – is fairly steady. We thus assume these variables to be fully captured by data from the year 2015 only. The results of the survey data offer further input to implement the last phase of the data collection.

Interviews

In the last phase of the data collection, conducted in 2018 using a non-random sampling technique (Babbie, 2008), we approached 167 of the online survey respondents (40% of all respondents) who indicated their willingness to participate in a follow-up survey or interview. We contacted them via the e-mail they provided in the online survey.²⁵ Semi-structured telephone interviews were conducted with 32 individuals (19 STEM workers and 13 non-STEM workers) by the authors themselves. On average, the interviews lasted 30 minutes and were conducted in either Dutch or English. Appendix A2.1 shows the interview guide, and Appendix A2.2 provides an overview of the statistics for the sample of interviewees. Several steps are taken to ensure the reliability of the interview analysis and results. First, all interviews were recorded and transcribed by the authors. Second, we make use of a deductive approach which means that the analysis of the interviews is organized around predetermined themes. The questions in the interviews are furthermore in line with the topics covered in the questionnaire of the online survey. The interviewees were asked questions related to five topics: 1) individual background information, 2) dwelling and living environment, 3) their neighbourhood's demographic composition, 4) the role of amenities and facilities, and 5) the role of commuting distance. The connections between respondents' answers in the interview data are mapped to the predetermined themes. By using predetermined themes, we can complement the data of the online survey with the results of the interviews and support the theoretical framework (O'Leary, 2010). In addition to the deductive approach, the interview results also seek to illustrate and clarify the quantitative results (Greene, Caracelli & Graham, 1989). Third, the data are organized manually and analysed following the framework noted in the literature review and in accordance with the hypotheses. We acknowledge that the interpretations during analysing the interviews can be entwined with a

²⁵ A total of 187 individuals were invited via e-mail, and delivery to 20 of them failed.

researcher's conscious and subconscious biases (e.g. prejudices). However, we believe that the structured approach used should guarantee a minimization of such biases.

2.3.4 Quantitative model

Rather than using a complex statistical modelling technique, we apply an ordinary least squares (OLS) regression as the main model to examine the impact of a diverse set of independent variables on the overall life satisfaction of STEM workers, relative to non-STEM workers. The estimation procedure of an OLS regression is simple because of its linearity. We consider this approach to be sufficient, especially considering the relatively low sample size of 420 respondents.²⁶ This study uses life satisfaction as a measure to capture overall long-term well-being. The use of self-reported well-being can suffer from measurement error, since self-evaluation, moods and emotions can fluctuate over time. However, there is broad consensus in the empirical literature that the measure of self-reported life satisfaction refers to an individual's overall cognitive evaluation of satisfaction with life, rather than an immediate experience such as happiness alone (Helliwell & Putnam, 2004; Diener, Oishi & Lucas., 2003; Diener et al., 1999). The question used to measure life satisfaction is, 'All things considered, how satisfied are you with your life as a whole these days?' The possible responses are on a scale from zero to 10, ranging from entirely dissatisfied to entirely satisfied. Life satisfaction scores are treated as cardinal, indicating that the distances between the different life satisfaction scores are all equal. The measure of life satisfaction is therefore assumed comparable across respondents (Ferrer-i-Carbonell & Frijters, 2004).

The main model for each individual i is²⁷

$$LS_i = \beta_0 + \beta_1 X_i + \beta_2 A_i + \beta_3 A_i * (STEM_i) + \varepsilon_i$$

²⁶ A multilevel regression could have further improved the quality of the analyses, allowing for simultaneously including effects at the municipality, neighbourhood or even street level. Our approach to measure at the municipality level only might miss out on neighbourhood level effects. Our sample size does however not allow us to run analysis at a more detailed geographical level than the municipality level.

²⁷ Respondents living across the border (1.9% in Germany and 2.5% in Belgium) are excluded from the statistical analyses because we are limited to geographical data and environmental characteristics for the Netherlands.

where LS_i , the dependent variable, denotes life satisfaction; β_o is the intercept; and X_i is a vector of individual control variables for the following: age, age squared, gender, marital status, nationality, highest educational level, STEM occupation (see below for further details), number of children living at home, monthly home expenses, and the number of years in the home. We additionally control for extraversion (the Big Five), since research suggests this personality trait in particular is a strong predictor of life satisfaction (Schimmack et al., 2004). Furthermore, we control for self-reported satisfaction with measures of individual income, social network, and health, all shown to be robustly associated with overall life satisfaction (Bernini & Tampieri, 2019; Morrison, 2007; Van Praag, Frijters & Ferrer-i-Carbonella, 2003). If significant associations remain in the model after controlling for these variables that are likely to influence life satisfaction, the characteristics of municipalities could have an independent impact on life satisfaction, although an omitted variable bias cannot be excluded (Morrison, 2007).

The term A_i denotes a vector of individual-specific place variables: commuting distance, amenities and facilities, demographic composition, urbanization level and the match between living preferences and actual residential behaviour.

Commuting distance

The distance in kilometres from home to the campus of the HTBP is calculated using the home and work postal codes. The distances are then calculated from coordinates downloaded from Google maps which measure the distance by road.

Accessibility to amenities and facilities

We use three indicators for amenities and facilities: first, the distance from one's municipality to the nearest main road (national or provincial road) in the municipality, which is based on the municipality one is living and the average distance of all residents in that municipality to the nearest main road; second, amenities are measured by the average number of amenities, such as restaurants, coffee houses, nightclubs, and food delivery services in a municipality; and, finally, the number of business establishments in a municipality.

Demographics

We use four indicators for the municipality's demographic composition: first, average income of the municipality, calculated by using individuals' personal annual incomes; second, a measure of cultural diversity, calculated as the ratio of the number of persons with at least one parent not born in the Netherlands to the entire population in a municipality; third, an ageing variable that shows the percentage of people aged

65 and above in a municipality; and, finally, population density, which is measured as the number of inhabitants per square kilometre.

Urbanization level

The urbanization level is based on respondents' municipality and classified into three groups – urban (1501 or more addresses per square kilometre; suburban (1001–1500 addresses per square kilometre; and rural (1000 addresses or fewer per square kilometre; – following the guidelines of Statistics Netherlands regarding the degree of urbanization (CBS, 2019b).

Living preferences and residential location

Living preferences are measured using the classical residential images method (Singelenberg, Goetgeluk & Jansen, 2011). In this method, the respondents select an image of a very urban (e.g. Maastricht), moderately urban (e.g. Sittard-Geleen), suburban (e.g. Beek) or rural (e.g. Gulpen-Wittem) residence resembling their residential as well as their residential environment preferences. The measurement of actual residential location is based on the urbanization level of the respondent's residential location, which is classified into four groups – very urban (1501- 2500 addresses per square kilometre), moderately urban (1001–1500 addresses per square kilometre), suburban (501-1000 addresses per square kilometre), and rural (499 addresses or fewer per square kilometre) – following the guidelines of Statistics Netherlands regarding the degree of urbanization of municipalities (CBS, 2019b).²⁸ A match is determined by similarity between the (very urban, moderately urban, suburban, or rural) residential image and the actual residential urbanization level (very urban, moderately urban, suburban, or rural).²⁹

28 The urbanization level of Statistics Netherlands is based on the address density. The address density is defined as the number of addresses within a circle with a radius of one kilometre around an address, divided by the area of the circle. Statistics Netherlands distinguished five categories. We do not classify very highly urbanized (i.e. with an average address density of 2500 or more addresses per square kilometre), because there are no individuals in our data actually living in a very highly urbanized area (CBS, 2019b).

29 We acknowledge that matching a picture of a residential environment with the degree of urbanization can cause a measurement error in the model. For example, people can interpret a picture of a residential environment differently. We aim to limit this possible error as the image of the residential environment contains all the attributes of the environment and is therefore considered to be representative (Singelenberg, Goetgeluk & Jansen, 2011). Furthermore, we acknowledge that the classification of the degree of urbanization can cause errors in the estimations. For example, there is a possibility that individuals live at the edge of a certain degree of urbanization and as a consequence the neighbouring unit can be a more relevant spatial context.

The independent variables A_i are interacted with $STEM_i$, a dummy equal to one to indicate individual i works in a STEM occupation, and zero otherwise. In the online survey, the respondents self-selected their occupation from a dropdown list of 13 occupational fields,³⁰ based on Dutch classification ROA-CBS 2014 (BRC 2014), derived from the 2008 International Standard Classification of Occupations (CBS, 2018). There is no standard classification of what makes up STEM occupations. We therefore refer to lower- and higher-education STEM occupations, including technical occupations, information and communication technology (ICT) professions, and researchers and research assistants. Commercial occupations, business economics and administrative occupations, service workers, and transport and logistics occupations are referred to as other occupations (Winters, 2017; European Parliament, 2015; Langdon et al., 2011).

Lastly, ε_i is a robust error term, clustered by municipality. The standard error is adjusted for 38 clusters, resembling the 38 municipalities covered in the dataset. This specifies that the observations could be correlated within municipalities, but independent across them (Cameron and Trivedi, 2009). Appendix A2.3 gives an overview of the summary and descriptive statistics. The continuous municipality-specific variables are centred by subtracting the mean from each variable. Furthermore, the relatively small sample size and large number of independent variables gives reason to suspect that the model could suffer from multicollinearity. We therefore test for multicollinearity among the main explanatory variables (i.e. place-specific variables) in our model. The variance inflation factor value measures the extent of multicollinearity. The place-specific variables show a mean variance inflation factor of 3.39, which is not considered high enough for multicollinearity (O'Brien, 2007).

In addition, the dependent variable for life satisfaction can be treated as a categorical or an ordinal variable. This implies that the different scores can be ranked from lower to higher, as for OLS, or ordered, as for ordered probit (OP). We additionally run an OP model to control for measurement error in our dependent variable. Besides OLS methods where different scores of life satisfaction are treated as being similar, in an OP regression the dependent variable, that is, life satisfaction, is calculated as having ordered categories for which the relative differences between the values on the life satisfaction scale are assumed to be unknown. Kingdon and Knight (2007) and Ferrer-i-Carbonell and Frijters (2004) have also used OLS and OP models similarly to explain life satisfaction scores.

³⁰ We choose to classify STEM workers based on their occupational field rather than on their field of study, because the latter does not necessarily indicate current employment in a similar field. Furthermore, we acknowledge that an even more fine-grained classification of STEM workers could be useful. Specific subgroups (e.g. ICT professions and researchers) can have different residential orientations. Our sample size is, however, too limited to distinguish between subgroups of STEM workers in the empirical model.

2.4 Results

2.4.1 Using life satisfaction to reveal living and place preferences

This section discusses the results of the regression models where we use life satisfaction as a dependent variable to reveal living and place preferences and tests our hypotheses. Columns (a) and (b), respectively, of Table 2.1 report the interaction results of the OLS and OP regressions for STEM workers. We additionally test for the impact of different values on the life satisfaction scale by presenting the marginal effects at the means (MEMs) for an OP regression in Table 2.2. The OP regression uses the same specification as the OLS regression. Appendix A2.4 reports the results of the full model.

First, for both OLS and OP regressions, we refer to the main effects on life satisfaction reported in Appendix A2.4. The table in Appendix A2.4 shows a significant negative effect for STEM workers. STEM workers are thus, on average, less satisfied with their life than non-STEM workers. To the best of our knowledge, no studies have previously explored the life satisfaction of STEM workers. Furthermore, increasing the distance from home to the nearest main road has a positive main effect on life satisfaction.³¹ This is in line with Brereton et al. (2008) who also find that close proximity to a major road (less than 5 km) impacts life satisfaction negatively. In addition, living in a suburban or rural environment relative to an urban environment negatively influences life satisfaction. This result is in contrast with Sørensen's (2014) study, which finds greater life satisfaction among European rural dwellers than among those living in urban areas. However, Shucksmith et al. (2009) find only small rural–urban differences in the quality of life in the Netherlands.

³¹ Recall that the effects presented here are not per se causal, but refer to a correlation.

Table 2.1 Interaction effects on life satisfaction for OLS and OP regressions

Life satisfaction	OLS (a)	OP (b)
<i>Interaction distance</i>		
STEM worker*distance to work	-0.005 (0.006)	-0.006 (0.007)
<i>Interaction access to amenities & facilities</i>		
STEM worker*distance to nearest main road	-0.722*** (0.245)	-0.940*** (0.317)
STEM worker*number of businesses	-0.000 (0.000)	-0.000* (0.000)
STEM worker*number of restaurants and bars	0.008 (0.0337)	0.035 (0.0405)
<i>Interaction demographics</i>		
STEM worker*average annual local income	0.321*** (0.105)	0.427*** (0.130)
STEM worker*cultural diversity	0.132** (0.053)	0.167** (0.065)
STEM worker*people aged >65	-0.259*** (0.0939)	-0.334*** (0.122)
STEM worker*population density	0.001 (0.000)	0.001 (0.000)
<i>Interaction urbanization level (ref.: urban)</i>		
STEM worker*suburban	1.149*** (0.399)	1.563*** (0.465)
STEM worker*rural	1.656*** (0.575)	2.186*** (0.703)
<i>Interaction living preferences & actual residence</i>		
STEM worker*match	-0.064 (0.229)	-0.074 (0.267)
Constant	3.944** (1.698)	
N	420	
R2 - pseudo-R2	0.376	0.164
<i>Individual control variables</i>	Yes	Yes
Robust standard errors are in parentheses, and coefficients shown		
*** p < 0.01, ** p < 0.05, and * p < 0.1.		

Next, the results for the interaction effects of STEM workers in Table 2.1 are consistent between the OLS method (column (a)) and the OP method (column (b)). Except for the coefficient estimated for the number of businesses, which is marginally statistically significant ($p < 0.1$) in column (b), there are no differences for the other coefficients with respect to their signs and levels of statistical significance. Furthermore, the coefficients in both columns are also of comparable magnitude. These results are generally in line with the studies of Brereton et al. (2008), Kingdon & Knight (2007), and Ferrer-i-Carbonell & Frijters (2004), who test the robustness of the coefficients explaining life satisfaction with OP and OLS methods but find no differences with respect to the signs or significance levels.

Commuting distance

There is no difference between STEM and non-STEM workers in terms of the relation between commuting distance and life satisfaction. The distance to work is negatively related to life satisfaction but it is not significant. We therefore do not confirm H₁, that commuting distance is negatively associated with life satisfaction more for STEM workers.

Access to amenities and facilities

We expect closer proximity to a major road to have a negative impact on life satisfaction for both STEM and non-STEM workers. We find the distance from the home to the nearest main road to have a positive main association of 0.342 ($p < 0.10$) on life satisfaction (Appendix A2.4), meaning that, the further away the main road, the higher life satisfaction. The OLS results in column (a) of Table 2.1 indicate that this association is -0.722 ($p < 0.01$) lower for STEM workers relative to all workers (i.e. compared to the main association). A similar finding is reported in column (b) for the OP results. This result implies that STEM workers value living closer to a main road more than non-STEM workers do. Therefore, we do not find evidence supporting H₂, that life satisfaction decreases for both STEM workers and non-STEM workers farther away from a main road. In addition, soft locational factors, such as amenities, are not observed to play an important role in the residential location choice of STEM workers. Only in the OP model (column (b) of Table 2.1) do we find a very small negative and marginally significant association of the number of businesses on overall life satisfaction for STEM workers relative to non-STEM workers. We therefore conclude that we cannot confirm H₃, which states that STEM workers attach a lower value than the average worker to amenities and facilities in their residential environment.

Local average income

The positive and statistically significant coefficient (0.321; $p < 0.01$) for the interaction effect of average annual income in municipalities and STEM workers indicates that a higher average income of Table 2.1 in a municipality increases the life satisfaction of the average STEM worker (see also column (b)). Our results are in line with previous studies that find positive relations between regional income and life satisfaction (Knies, 2011; Dittmann & Goebel, 2010; Clark et al., 2009; Knies et al., 2007); however, these studies do not focus on STEM workers. In our study, we do not find this association for all workers (see the main effect in Appendix A2.4); H4 is therefore only confirmed for STEM workers.

Cultural diversity

We further explore the relation of local cultural diversity on life satisfaction. The OLS results indicate that life satisfaction increases for the average STEM worker by 0.132 ($p < 0.05$) with greater cultural diversity in a municipality. We find similar results in column (b) of Table 2.1 for the OP model, consistent with studies by Florida (2002b) and Florida and Gates (2001), who find a positive relation between diversity and the concentration of high-tech industries. The results also confirm H5, that is, STEM workers in a residential environment with greater cultural diversity have above-average life satisfaction.³²

Ageing and population decline

Next, we address the role of the percentage of people aged 65 and above in a municipality. Greater ageing in a municipality indicates lower life satisfaction for the average STEM worker (0.259; $p < 0.01$). A rising number of the elderly is one of the factors driving demographic change. Challenges due to demographic change can indicate not only a shortage of people in the working age population and a burden on the health and social welfare system, but also a low level of local amenities for the working age population, and therefore the place's lower degree of attractiveness (OECD, 2013, 2014). Our results confirm the negative relation of population ageing in a municipality on life satisfaction for STEM workers only (H6). Therefore, we confirm H6 only for STEM workers.

³² Note that the group of STEM workers in our sample is slightly more culturally diverse (i.e. non-Dutch) than non-STEM workers are (see Appendix A2.3). This finding could be correlated with cultural diversity, since, in a culturally diverse place, there will be more resources for a non-Dutch population.

Urbanization level and population density

The results indicate that life satisfaction for the average STEM worker increases by 1.656 ($p < 0.01$) and 1.149 ($p < 0.01$) in a rural or suburban residence, respectively, relative to an urban environment. These associations for STEM workers contrast with the negative main associations for the average worker living in a suburban (-0.749 ; $p < 0.01$) or rural (-0.981 ; $p < 0.05$) area (see Appendix A2.4). This result aligns with previous studies that find workers in technical occupations have above-average preferences for non-urban residential environments (Boterman and Bontje, 2016; Kotkin, 2000). This finding confirms H7, which states that life satisfaction drops more for STEM workers than for non-STEM workers as population density or urbanity increases.

2.4.2 Testing for heterogeneity

Table 2.2 reports the MEMs³³ for the interactions to test the relation of the different values on the life satisfaction scale. The marginal outcomes of the OP regression are calculated for each value of the dependent variable. Table 2.2 reports the marginal results for the values of eight to 10 on the life satisfaction scale, because these were the values most STEM respondents (70.9%) gave. Less than one-third of the scores were seven or below. See Appendix A2.5 for an overview of the marginal outcomes at all the different values measured for the dependent variable. To the best of our knowledge, no previous studies have reported the outcomes of different values of the life satisfaction scale separately. Most studies linking life satisfaction to place apply an OP modelling approach and do not explore the results for the different values of the life satisfaction scale (Morrison, 2011; Shields et al., 2009; Morrison, 2007; Shields & Wheatley Price, 2005). Brereton et al. (2008) and Kingdon and Knight (2007) report the results of both OLS and OP regressions, but do not report the results for different values.

33 We find similar results when computing average marginal effects.

Table 2.2 Results for the MEMS of the OP regression on life satisfaction for the values of eight to 10 on the life satisfaction scale

Life satisfaction	OP Value 8 (a)	OP Value 9 (b)	OP Value 10 (c)
<i>Interaction distance</i>			
STEM worker*distance	-0.0000 (0.0002)	-0.00224*** (0.0009)	-0.0009** (0.0004)
<i>Interaction access to amenities & facilities</i>			
STEM worker*nearest main road	-0.0019 (0.0120)	-0.0936*** (.0288)	-0.0405*** (0.0101)
STEM worker*number of businesses	-6.6000 (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)
STEM worker*number of restaurants and bars	0.0000 (0.0003)	0.0024 (0.0053)	0.0011 (0.0022)
<i>Interaction demographics</i>			
STEM worker*average annual local income	0.0016 (0.0101)	0.0790*** (0.0239)	0.0342*** (0.0097)
STEM worker*cultural diversity	0.0004 (0.0025)	0.0195*** (0.0049)	0.0085*** (0.0026)
STEM worker*people aged >65	-0.0012 (0.0080)	-0.0619*** (0.0167)	-0.0268*** (.0066)
STEM worker*population density	1.2100 (0.0000)	0.0000 (0.0001)	0.0000 (0.0000)
<i>Interaction urbanization level (ref.: urban)</i>			
STEM worker*suburban	0.0552 (0.0644) (0.0146)	0.0786 (0.558)	0.0259*
STEM worker*rural	0.0328 (0.0439)	0.1436* (0.0809)	0.0612* (0.0352)
<i>Interaction living preferences & actual residence</i>			
STEM worker*match	-0.0012 (0.0135)	0.0371* (0.0206)	0.0166 (0.0112)
<i>Individual control variables</i>			
	Yes	Yes	Yes
The MEMS for the factor levels are discrete changes from the base level. Standard errors are in parentheses, and *** p < 0.01, ** p < 0.05, and * p < 0.1.			

We find a consistent pattern emerging from the marginal outcomes in all three columns of Table 2.2. First, they almost always have the same signs as the results in Table 2.1. The magnitudes of the coefficients differ from the results in Table 2.1, and

the levels of statistical significance remain the same for the highest values, apart from the interaction of the STEM worker variable with commuting distance, urbanization level and the match between living preferences and actual residence. The coefficient for the commuting distance becomes significantly negative, indicating that increasing commuting distances lowers life satisfaction. Moreover, the statistical significance of the interaction with urbanization decreases and the match between living preferences and actual residence becomes positive and marginally significant in Table 2.2.

The results for workers reporting life satisfaction scores of seven or below (one-third of the total sample), however, are not in line with the overall results, as shown in Appendix A2.5. Even though controlling for individual characteristics likely impacts overall life satisfaction (satisfaction with health, income, and social network), the resources needed to satisfy one's needs differ depending on the extent to which respondents are satisfied with their overall life. Workers scoring high in overall life satisfaction could already have the resources needed to satisfy all needs and, hence, external factors, such as the living environment, could start to play a different role. This means that the weights assigned by individuals to the life satisfaction scale are heterogeneous and 'context dependent' (Faggian, Olfert & Partridge, 2012). Workers' preferences seem to be heterogeneous with respect to life satisfaction. Low scorers in life satisfaction are associated with longer commuting distances, less culturally diverse environments, environments with greater ageing, and a lower average annual income in municipalities. These results contrast with our hypotheses. The levels of significance, however, vary depending on the value on the life satisfaction scale.

2.4.3 Integrating qualitative results from interviews with quantitative results

In this section, we report the most important interview findings and link them to the results of the quantitative analyses. This approach allows us to better understand the residential location choice and the characteristics of the residential location. Furthermore, through insights into the respondents' living environment, we arrive at a more nuanced understanding of the role individual-specific place variables (e.g. commuting distance and time) and place-specific variables (e.g. amenities and facilities, demographic composition) play in the living environment. The 32 interviewees were, on average, 45.6 years old (ranging from 31 to 65 years), five were female and 28 were male; 19 interviewees were STEM workers and 13 were non-STEM workers. The majority of the workers were born in the Netherlands (N = 26), with 20 interviewees born in the province of Limburg, followed by other European countries (N = 4) and non-European countries (N = 2). See Appendix A2.2 for more information on the interviewees and the outcomes.

Life satisfaction

All respondents reported being satisfied with their current living environment, confirming the assumption that the current situation generally reveals the living preferences of the respondents in the online survey and the quantitative analyses. For example, the following statements were made:

Yes, I am satisfied with the living environment. I enjoy living here. If I were not satisfied, I would not live here. If I were unsatisfied, I would change it. (Female, 42 years, bachelor's degree in economics, interview 20)

I find the quality of life higher in the south of the country than in the west. It is less hectic, less busy on the road, a more spacious living environment, and larger dwellings for the same amount of money. Also, in terms of people, the west of the country is pretty individualistic, and here it is more social, associations and things like that. A downside is that I am further away from my family and it is a downside to me that there is no sea and beach. (Male, 51 years, master's in business economics, interview 23)

A few interviewees desired changes:

I am satisfied with my dwelling and the neighbourhood, but I would desire a more sustainable environment. For example, we still have a natural gas network. I find sustainable living very important, not only for my dwelling, but also for my neighbourhood. (Male, 51 years, bachelor's in information technology, interview 12)

I am satisfied with the living environment. With the house, I still need to fix some things, but that will come with the time, I am working on it. I don't like spending too much money on the house and things like that. (Male, 43 years, PhD in polymer processing, interview 9)

Commuting distance

According to H1, a longer commuting distance should negatively impact life satisfaction to a greater extent for STEM workers than for non-STEM workers, which is not confirmed by the quantitative analysis. Regarding the qualitative analysis of the interview findings, the commuting time turns out to be very important for most STEM interviewees. However, the same is true for an even larger percentage of the non-STEM interviewees. The qualitative analysis of the interviews is therefore in line with the results of the quantitative analysis, so we cannot confirm H1. Even though not statistically significant in the quantitative analysis, the sign of the main effect (Appendix A2.4) of the commute distance on life satisfaction is negative. When we

integrate the interview findings into the hypothesis testing, we find that increasing the commuting distance negatively impacts life satisfaction for both STEM and non-STEM workers: 'I do find distance important, and it is getting even more important, especially because our baby will be born soon' (male, 35 years, vocational training in mechanical engineering, interview 4) and 'I find distance to work very important. In my opinion, everyone should live within cycling distance from work, which is especially important for the future environment (male, 51 years, bachelor's in information technology, interview 12) and 'I find it important to live close to work. Especially after a night shift, I do not want to drive back home for a long time' (male, 38 years, vocational training in process techniques, interview 15).

Furthermore, STEM interviewees go to work by either car, bicycle, motorcycle, or public transportation, whereas non-STEM interviewees more often take the car. STEM interviewees cycle, on average, 37 minutes to work and seem to strongly value physical activity and a sustainable environment: 'I go to work by bike to stay in good condition. It saves money and it is also better for the environment (Bachelor in Mechanical Engineering, male, 43 years, Interview 1)'. Another STEM interviewee comes to work by car but prefers to cycle to work:

I currently go to work by car (12 minutes), but the plan is to go more often by bike. I currently moved to the northern part of the site, so that makes it a bit more difficult to come by bike. I used to work in the southern part [...] I also go to the gym in between work, so coming by bike would take a lot of time. (Male, 43 years, bachelor's in mechanical engineering, interview 1)³⁴

In addition, both STEM and non-STEM workers there have an average commuting time of approximately 25 minutes, regardless of the form of transportation.

Access to amenities and facilities

According to H2, closer proximity to the amenity major road would have a negative impact on life satisfaction for both STEM and non-STEM workers.

I live on the outskirts of the city; I am in a few minutes in the inner city and in a few minutes on the highway (Female, 42 years, bachelor's degree in economics, interview 20)

³⁴ Note that the high-tech business park is one of the largest (800 hectares) chemical sites in Europe (Chemelot, 2018).

However, the interviews did not allow us to confirm H₂ since we find STEM workers value living closer to a main road more than non-STEM workers do.

Furthermore, several STEM interviewees also pointed out the importance of a nearby train station: ‘When I just moved here, I had no car, so the availability for public transportation was very important to me’ (male, 31 years, master’s in technical systems and controller, interview 14) and ‘I also find it important for my children to have a train station nearby’ (male, 51 years, bachelor’s in chemical engineering, interview 13).

In addition, hypothesis H₃ states that STEM workers attach a lower value than the average worker to amenities and facilities in their residential location, which cannot be confirmed in the quantitative analysis. This result is supported by the interviewees, however. For many respondents, it is important to have basic amenities and facilities, such as a supermarket or general practitioner (GP), nearby (within a radius of 15 minutes, preferably walking or cycling distance). They indicate that it is easier to have such amenities and facilities nearby, especially when you have a full-time job or children or when you do not have a car.

Some interviewees find the availability of local amenities and services limited, which is a result of demographic change:

The main supermarket in our village closed its doors a while ago, and there is only one little supermarket left. I can imagine that if you are a bit older that you want to be in proximity to such facilities, but we actually do a lot by bike or by car. (Male, 43 years, bachelor’s in mechanical engineering, interview 1)

I do miss some facilities. There are not a lot of ATMs in our village, and the bank where I have my bank account does not have its office in the village anymore. I need to drive to a town for that. (Male, 65 years, vocational training in mechanical engineering, interview 16)

Other interviewees also indicated that the locations of amenities and facilities did not play a role in choosing their residence:

I did not consider the proximity to facilities and amenities in my location choice. We did not have children that time and you do then not really consider it. For other amenities such as restaurants, you already assume that you won’t find that in a village. We never thought about that, therefore it is also less important. (Male, 43 years, bachelor’s in higher laboratory education, interview 2)

In addition, about 75% of the STEM interviewees did not find it important to have urban amenities and facilities, such as museums, restaurants, and concert halls, nearby:

I do not really find it important to have a theatre, museum, or so nearby. Restaurants would be nice; we actually always need to leave the village to go out for dinner. We go to a restaurant, like, once a month approximately. (Male, 34 years, vocational training in industrial electronics, interview 7)

Similar findings hold for non-STEM interviewees. There are no consistent similarities for the eight (out of 32) interviewees who did find it important to have urban facilities and amenities nearby. They reside in areas of different urbanization levels and differ in their marital status. They are, on average, 46 years old. The only similarities we find within the group that finds it important to have urban facilities and amenities nearby is that they have a higher vocational degree or above and are Dutch:

The supermarket is in walking distance and all the other facilities and amenities are in cycling distance. I find it pleasant to have these nearby. It makes life easier, especially when you have a full-time job. Also, I find it very pleasant to have theatres and restaurants nearby. I go to the cinema, out for dinner, or to a bar at least once a week. (Male, 56 years, bachelor's in several fields, interview 27)

The results of the interviews suggest that the majority of the STEM interviewees do not place much value on urban amenities and facilities. This finding is in line with previous studies that indicate that soft locational factors, such as amenities, do not play a role in the residential location choice of STEM workers (Boterman & Bontje, 2016; Scott, 2010). We find, however, similar results for non-STEM interviewees. This result is in line with those of Sleutjes (2013), who finds that soft factors do not play a dominant role in residential location choice in Europe.

Local average income

Hypothesis H₄ supposes a positive relation between local average income and life satisfaction for both STEM and non-STEM workers. The results of the quantitative analysis confirm H₄ only for STEM workers. In contrast to the quantitative analysis, the qualitative analysis finds that life satisfaction increases for both STEM and non-STEM workers if the municipality's average income is higher. Based on their own reports, the interviewees all indicated they were living in an average to wealthy neighbourhood: 'If I see what the people in the street do and that they are all

homeowners and have two cars per family, I would describe it as a rich environment' (male, 43 years, bachelor's in higher laboratory education, interview 2), and

I would describe it as a wealthy neighbourhood – well, the majority of people have a detached home [...] if I see their spending pattern, in terms of what they do or their hobbies, then they should have quite a large pension. (Male, 59 years, bachelor's in business administration, management, and safety, interview 30).

The information on the street and neighbourhood level given by the interviewees emphasizes the need for analyses at lower geographical levels than the municipality level only, as we do in the quantitative analyses.

Cultural diversity

The quantitative analysis confirms H5, with above-average life satisfaction for STEM workers in a residential environment with greater cultural diversity. The interview results are in line with the results of the quantitative analysis:

Where we live, there are a lot of international people – there is Spanish and other Italians and Turkish and Chinese, and about 85% is families with young children. As far as I know, there is only one elder woman. (Female, 35 years, PhD in biotechnology, interview 6)

It has become very diverse over the last years [...] quite a few foreigners moved into this apartment complex, especially Indians, who are often expats. They rent the place for a temporary period [...] there are also students and elderly living there, and over the last years many young families with children moved in. (Male, 53 years, PhD in chemistry, interview 19)

We find that most of the STEM interviewees lived in culturally diverse neighbourhoods. This does not hold for non-STEM interviewees: 'It is a mix of families with young children and the first residents, so elderly, let's say. Only Dutch people are living here' (male, 51 years, master's in business economics, interview 25).

Ageing and population decline

Hypothesis H6 assumes a negative relation between population ageing in a municipality on life satisfaction for both STEM and non-STEM workers. In the quantitative analysis, this hypothesis was only confirmed for STEM workers. The

findings from the interviews support the outcome of the quantitative analysis. Most STEM interviewees indicated they lived in a relatively young neighbourhood:

The elderly are actually leaving one by one because they are passing away. In return, quite a few young adults without children are moving to this neighbourhood because the dwellings are suitable for starters [...] it is actually a rejuvenation of the neighbourhood. (Male, 43 years, bachelor's in mechanical engineering, interview 1)

There were only young families living here when we just moved to this street, and about 30% are still living here. New young families replace the families that left the street. We are actually one of the older persons living here. (Male, 53 years, bachelor's in higher Laboratory education, interview 3)

STEM interviewees appear to live more often in younger environments than non-STEM interviewees: 'The average age in our neighbourhood is around 45, 50, I would say. There are not so many children living here, which is maybe a pity for my children' (female, 46 years, bachelor's in communication and psychology, interview 21) and 'There is one younger couple living in the street and three older couples, most of them are aged 50 or over' (male, 57 years, bachelor's in senior facility management, interview 27).

Urbanization level and population density

The quantitative analysis confirms H7, that life satisfaction drops more for STEM workers than for non-STEM workers as the population density or urbanity increases. The results of the qualitative analysis support these findings. The results of the interviews furthermore note that the choice of the residential environment is not made independent of one's partner. In addition, a combination of different factors contributes to overall life satisfaction. Even though some interviewees actually prefer rural living, this does not necessarily mean they are dissatisfied. The residences of the STEM interviewees are more or less equally distributed across the three levels of urbanization (rural, suburban, and urban). The age composition is also relatively equally divided, considering the degree of urbanization. The seven STEM interviewees residing in urban areas were, on average, 42 years old, most were in a relationship, most had a higher education, and four were non-Dutch: 'The main reason for choosing this town is there is a more internationally diverse community, and the other reason is for the child, because we prefer our child to go to an international school' (male, 43 years, PhD in polymer processing, interview 9).

A slightly higher percentage of STEM interviewees than non-STEM interviewees lived in urban areas. However, four STEM interviewees pointed out they would prefer more rural living instead. A mix of factors often plays a role in living preferences, such as regional familiarity, income, workplace, and the partner's living preference:

My wife prefers an urban area; she is more of a city person. We have both: we are 500 metres from the German border, which is very rural, and, on the Dutch side, we have the amenities and facilities in walking distance of our home. (Male, 43 years, bachelor's in higher laboratory education, interview 2)

I would have preferred a village over a city, because it is quieter and more personal [...] but I think that it depends on where you come from, what you are used to. I grew up in a village and I guess that I therefore prefer to live in a village. (Female, 42 years, bachelor's in mechanical engineering, interview 11)

We are not happy in a city [...] all the noise and pollution. My wife and I grew up in the countryside. The countryside is a place to relax, we can go for a walk in the evening, we like the space around us [...] we now look into the dike, an open field, the river Meuse and into Belgium. (Male, 60 years, bachelor's in higher technical training, interview 19)

In some cases, the dwelling itself is the decisive factor, and less so the municipality or neighbourhood: 'I moved here because of the dwelling. I did not even want to move to this village. I fell in love with the dwelling, and the living environment did not play a role' (male, 57 years, bachelor's in senior facility management, interview 27). Other interviewees perceive their current urban residential location as not big: 'It is not a big city, it is a medium-sized city, let's say [...] it is the second smallest town I have ever lived in (female, 35 years, PhD in biotechnology, interview 6), and 'I am from bigger cities, such as San Francisco; the town I currently live in is not big to me' (male, 34 years, PhD in chemical engineering, interview 11).³⁵

³⁵ Most of the international STEM interviewees with PhD degrees resided in Maastricht, the capital of the province of Limburg. In Maastricht, 30% of the population has a cultural background other than Dutch (CBS, 2019c). The interviewees with PhD degrees reported that international employees live in this city more often because either their companies' HR departments suggested they live there or the international community already living in this city served as a pull factor.

2.5 Conclusion

This chapter argues that life satisfaction is related to features of the geographical unit in which one resides. Individuals are assumed to settle in an environment that they consider the most desirable and attractive. Interview findings confirm this assumption, since all the respondents reported being satisfied with their current living environment.

Controlling for personal characteristics, we have hypothesized that distance, municipality characteristics, and the degree of urbanity are likely to have an impact on individual life satisfaction. The reference point for this study is the case of STEM workers in a high-tech business park in a peripheral region in the southernmost part of the Netherlands. The current study primarily explores the residential location choice of those employed in STEM fields.

The qualitative and quantitative results suggest that STEM workers prefer living within a relatively short commute distance and near a main road. In this study, the majority of the STEM workers commuted less than 20 km and have a main road within 2 km of their home. We find similar results for non-STEM workers. However, the interview results reveal that non-STEM workers commute more often by car than STEM workers, who prefer to travel to work by either bicycle, car, motorcycle, or public transportation. In relation to commuting, interviews with STEM workers indicate that they strongly value physical activity and a sustainable environment. The results suggest that policymakers and planners concerned with the building environment should focus on the surroundings of the HTBP at stake.

We do not find an amenity-intensive lifestyle, involving bars, nightlife, and restaurants, to have a statistically significant impact in the quantitative analysis. The findings from the interviews also suggest that the majority of the STEM interviewees do not place much value on amenities and facilities such as museums, theatres, and restaurants. Nevertheless, most STEM interviewees reported preferences for basic amenities and facilities, such as supermarkets and GPs. The same holds for non-STEM workers.

The demographic composition of a municipality one settles in seems, furthermore, to play a role in the living preferences of STEM workers. We find different results for STEM workers relative to non-STEM workers in both the quantitative and qualitative analyses. We find STEM workers who live in areas with greater cultural diversity to have higher life satisfaction, and STEM workers who live in areas with greater ageing to have lower life satisfaction. Furthermore, we expected higher levels of life satisfaction for all workers with the municipality's increasing average income. This result only holds for STEM workers in the quantitative analysis, whereas the qualitative analysis finds that all workers value living in a wealthy environment. We additionally note that STEM interviewees particularly care about sustainable living environments (e.g. a greener gas grid and solar panels).

Furthermore, the distributions of STEM and non-STEM workers living in either a rural, suburban or urban area are about the same. However, living in a rural or suburban instead of an urban area has a positive impact on life satisfaction for STEM workers, in contrast to the lack of such an impact for non-STEM workers. Moreover, several interviews with STEM workers living in urban areas indicate that a more rural life is preferred. A mix of factors often plays a role in living preferences. For example, decisions with regard to living preferences are not taken independent of the workers' partners. The background, preferences, and workplaces of the partners are also relevant. In addition, regional familiarity and income play a role. Lastly, the interviews reveal that the municipality or neighbourhood is not always the decisive factor in the preferred living environment, but sometimes the dwelling itself.

Henceforth, rather than suggest that the majority of people occupied in creative and knowledge-intensive sectors prefer settling in urban areas, as much of the academic debate and policies imply, our results indicate that the average STEM worker seems to prefer a less vibrant lifestyle. This finding implicitly calls for a different view of the attractiveness of different geographical areas and across different (sub)groups. We argue that a more nuanced approach is important when developing strategies to attract STEM workers. The urban milieu has become a dominant area of research and policy, and mainstream approaches to spatial planning are based on growth-oriented paradigms. From that perspective, shrinking rural and suburban areas often have a less positive connotation.

The findings of the quantitative and qualitative analyses emphasize that strategies to attract the average STEM worker should focus on places of lower extraversion, which are often characterized by less dense places, such as a suburban or rural environment, green areas, and open spaces, with a little touch of consumer amenities. The residential area surrounding the HTBP is a suitable location because of its nearby green areas and daily amenities and facilities. The accessible landscape, with its greenery, tranquillity, and sports facilities, is thus a very attractive regional asset.

Furthermore, to attract STEM workers, it is important to make this group aware of existing rural and suburban residential areas. For example, human resources departments could advise their newly recruited international STEM personnel to live in these areas instead of suggesting that they live in the capital of the province (i.e. Maastricht). It would be relevant to give workers a broader perspective on the possibilities regarding living environments and to explicitly ask for their (previous) living preferences and experiences. This goal also calls for strategies to attract STEM workers that go beyond employment opportunities. It is important that different companies and businesses, real estate parties, universities, and (local) governments continue working together to create an attractive living environment, a well-functioning housing market, and a stronger, sustainable knowledge economy.

Accordingly, policies should capture the human atmosphere contributing to the social and economic processes that construct a particular spatial setting.³⁶

One should not, however, generalize unduly from our findings. Every place is unique and has its own historical pathways and characteristics (Wiechmann & Bontje, 2015; Musterd & Gritsai, 2013). We nevertheless believe that our analyses of the experiences of STEM employees in a HTBP in a shrinking region provide a (first) direction towards place-based policies.

We have shown an association between the different characteristics of a municipality and individuals' life satisfaction. We find this association to hold particularly for high scorers in life satisfaction. Our mixed methods study on living preferences in relation to life satisfaction has shown itself to be useful. We continue to find statistically significant associations between different aspects of a place and individual life satisfaction after controlling for individual characteristics known to influence life satisfaction. This result suggests that the characteristics of municipalities can also have an independent impact on life satisfaction (Morrison, 2007). After all, individuals identify with their living environment (see also Massey, 1995) and, as Florida (2013) note, they derive satisfaction and emotional attachment from their places of residence. We hope this finding encourages future research on living preferences to link personal characteristics and environmental variables to life satisfaction and to test the associations for different (sub)groups and geographical areas.

2.6 Appendix

Table A2.1 Interview guide

<i>Personal information</i>
Gender
Age
Born:
Marital status:
Children living at home:
Type of job:
Years working at the campus:
<i>Dwelling & living environment</i>
Place of residence:

³⁶ For an overview regarding suggestions for spatial strategies for this region, see Van Bussel et al. (2016, pp. 65–98).

Satisfaction & importance:
Rural – suburban – urban
Dwelling type & rental/own:
Years in dwelling:
Number of moves:
Factors for choosing the current dwelling:
Factors for choosing the current living environment:
Are you satisfied with your dwelling?
If not, what would you desire/wish?
(Demographics) How would you describe your living environment? (for example, quiet, busy, young, old, poor, rich)
Are you satisfied with your living environment?
If not, what would you desire/wish?

Access to amenities and facilities
Do you find it important to have amenities and facilities (such as a supermarket or GP) near (radius of 15 min) home?
Why/why not?
Do you find it important to have a lot of amenities and facilities (swimming pool, museum, restaurants, and concerts) near home?
Why/why not?
Are you satisfied with the amenities and facilities in your living environment?
If not, why not?

Distance
What transportation do you use to go to work?
What is your commute time (one way)?
Do you find the role of the commute distance important/satisfactory?
Why/why not?
Leisure time and personality

What are your hobbies?

What do you do in your spare/leisure time?

Do you participate in any associations (e.g. music, sports)?

If so, how often do you participate each week?

If not, why not?

Would you describe yourself as an introvert or extravert?

Why?

Additions & questions

Table A2.2 Descriptive overview of the interviewees

	STEM (%)	Non-STEM (%)
Individual characteristics		
Male	89.5	76.9
Age in years (mean)	44.4	50.7
Born in Limburg Province (NL)	57.9	69.2
Born elsewhere in the Netherlands	15.8	23.1
Born abroad	26.3	7.7
Low educational level (vocational training)	21.1	n/a
Medium educational level (bachelor's)	42.1	69.3
High educational level (master's or above)	36.8	30.7
Children living at interviewee's home	52.6	69.3
Place characteristics		
<i>Distance</i>		
Commute time is important	78.9	92.3
Commute time in minutes (mean)	23.7	25.3
Transportation to work is a car	57.9	76.9
Transportation to work is a bike	26.3	23.1
Transportation to work is other	15.8	n/a
<i>Amenities and facilities</i>		
Basic amenities and facilities are important	94.7	92.3
Urban amenities and facilities are important	26.3	23.1
<i>Demographic composition</i>		
Lives in an average to wealthy neighbourhood (own perception)	100	100
Young to mixed age distribution in neighbourhood (own perception)	94.7	61.5
Cultural diversity in neighbourhood (average to yes) (own perception)	73.7	7.7
<i>Living environment</i>		
Home owner	89.5	92.3
Satisfied with living environment	100	100
<i>Urbanization level</i>		
Urban living	36.8	23.1
Suburban living	31.6	23.1
Rural living	31.6	53.8
Overall life satisfaction	100	100
<i>N</i>	19	13

Table A2.3 Summary and descriptive statistics of the survey respondents

Variable	STEM mean	SD	Min	Max	Non-STEM mean	SD	Min	Max
Individual characteristics								
Life satisfaction	8,92	1,12	3	10	9,03	0,99	6	11
Age	46,89	11	23	64	48,19	9,62	27	64
Age squared	2320	998	529	4096	2414	900	729	4096
Extraversion, Big Five	1,93	0,94	-,06	4,3	2,34	0,97	-,06	4,5
Satisfaction income	8,78	1,46	0	10	8,87	1,44	0	10
Satisfaction social network	9,01	1,13	3	10	9,04	1,21	4	10
Satisfaction health	8,77	1,44	2	10	8,70	1,48	2	10
Place characteristics								
<i>Distance</i>								
Distance from home to work	19,48	14,78	2,60	74,40	18,23	17,55	1,5	109
Distance from home to the nearest main road	1,69	0,47	0,6	4	1,63	0,42	0,90	2,70
<i>Amenities and facilities</i>								
Number of businesses	4359	3255	475	18400	4188	3300	475	18400
Average number of restaurants and bars in a radius of 1 km	5,03	3,36	1,55	12,55	4,82	3,04	1,55	12,55
<i>Demographic composition</i>								
Average annual income per inhabitant in a municipality [x1,000]	22,44	1,07	20,20	25,70	22,54	1,32	20,20	28,90
% cultural diversity	10,18	3,37	4	24	10,06	2,93	4,50	16
% people aged 65 and over	21,82	1,94	16	27	21,85	1,88	16	27
Number of inhabitants per km ²	1170	666	149	2546	1164	615	198	2546
<i>N</i>	258				162			
	61,43%				38,57%			

Variable	STEM %	Non-STEM %
Individual characteristics		
Male	87.6	71.6
Partner	84.9	88.3
Dutch	86.4	93.8
Low educational level	33.7	27.8
Medium educational level	40.3	45.7
High educational level	26.0	26.5
Children living at home	51.2	61.1
Monthly expenses of dwelling < €400	20.5	13.6

€400–€699	34.5	27.8
€700–€999	23.6	29.0
€1000–€1500	17.4	22.2
>€1500	3.9	7.4
Place characteristics		
Living urban	28.7	24.7
Living suburban	30.2	32.7
Living rural	41.1	42.6
No match between living preferences & actual residence	60.5	63.0
<i>N</i>	258	162
	61.43	38.57

Table A2.4 Full-model OLS and OP

Life satisfaction	OLS	OP
<i>Control Variables</i>		
Age	0.0188 (0.0617)	0.00509 (0.0708)
Age squared	-0.000188 (0.000660)	-6.07e-05 (0.000769)
Gender (female)	0.0301 (0.204)	0.0202 (0.245)
Extraversion, Big Five	0.119** (0.0572)	0.144** (0.0671)
Partner (yes)	0.243* (0.131)	0.342* (0.182)
Nationality (Dutch)	0.0710 (0.171)	0.0542 (0.225)
Medium education (ref.: low)	-0.0970 (0.0890)	-0.119 (0.106)
High education	0.0277 (0.131)	0.0169 (0.183)
Children living at home (yes)	-0.111 (0.117)	-0.165 (0.125)
Monthly expenses dwelling €400–€699 (ref.: < €400)	0.0169 (0.102)	0.0503 (0.137)
€700 to €999	-0.0598 (0.105)	-0.112 (0.128)
€1000 to €1500	0.0537 (0.0999)	0.0717 (0.128)
>€1500	0.461** (0.203)	0.626** (0.278)
Years living in dwelling	0.00733	0.00835

	(0.00560)	(0.00691)
Satisfaction with income	0.0926	0.127*
	(0.0554)	(0.0675)
Satisfaction with social network	0.236***	0.297***
	(0.0526)	(0.0648)
Satisfaction with health	0.188***	0.229***
	(0.0412)	(0.0404)
STEM worker	-1.033***	-1.407***
	(0.357)	(0.431)
Distance from home to work	-0.00384	-0.00572
	(0.00335)	(0.00414)
Distance from home to the nearest main road	0.342*	0.434*
	(0.191)	(0.249)
Number of businesses in a municipality	-5.21e-05	-6.12e-05
	(3.10e-05)	(3.87e-05)
Number of restaurants and bars in a municipality	-0.0133	-0.0191
	(0.0236)	(0.0286)
Average annual income municipality	0.0281	0.0266
	(0.0441)	(0.0524)
Cultural diversity	-0.0473	-0.0587
	(0.0437)	(0.0540)
People aged 65+	-0.000591	-0.00607
	(0.0618)	(0.0775)
Population density	-0.000184	-0.000321
	(0.000195)	(0.000253)
Match living preferences and actual residential behaviour	0.213	0.277
	(0.186)	(0.232)
Living in a suburban environment (ref.: urban)	-0.749***	-1.053***
	(0.247)	(0.321)
Living in a rural environment	-0.981**	-1.369***
	(0.396)	(0.508)
Interaction distance		
STEM worker*distance	-0.00504	-0.00646
	(0.00582)	(0.00691)
Interaction access to amenities & facilities		
STEM worker*nearest main road	-0.722***	-0.940***
	(0.245)	(0.317)
STEM worker*number of businesses	-8.38e-05	-0.000121*
	(5.18e-05)	(6.48e-05)
STEM worker*number of restaurants and bars	0.00819	0.0347
	(0.0337)	(0.0405)
Interaction demographics		
STEM worker*average annual income municipality	0.321***	0.427***

	(0.105)	(0.130)
STEM worker*cultural diversity	0.132**	0.167**
	(0.0527)	(0.0650)
STEM worker*people aged 65+	-0.259***	-0.334***
	(0.0939)	(0.122)
STEM worker*population density	0.000559	0.000678
	(0.000363)	(0.000444)
<i>Interaction living preferences & actual residence</i>		
STEM worker*match	-0.0636	-0.0737
	(0.229)	(0.267)
STEM worker*suburban	1.149***	1.563***
	(0.399)	(0.465)
STEM worker*rural	1.656***	2.186***
	(0.575)	(0.703)
Constant	3.944**	
	(1.698)	
<i>N</i>	420	
R2 - pseudo-R2	0.376	0.1643
Robust standard errors are in parentheses, and *** p < 0.01, ** p < 0.05, and * p < 0.1.		

Table A2.5 MEMs of the OP model for all values of the life satisfaction scale

	MEMS	Std. error
<i>Distance from home to work</i>		
3#Non-STEMoccup	6.10e-07	1.12e-06
3#STEMoccup	2.04e-06	3.07e-06
4#Non-STEMoccup	4.52e-06	5.13e-06
4#STEMoccup	0.0000147	0.0000105
5#Non-STEMoccup	0.0000476	0.0000486
5#STEMoccup	0.0001498***	0.0000629
6#Non-STEMoccup	0.0001833	0.0002013
6#STEMoccup	0.0005578**	0.0002575
7#Non-STEMoccup	0.000876	0.000882
7#STEMoccup	0.0025305**	0.0011366
8#Non-STEMoccup	0.000069	0.0001233
8#STEMoccup	-0.0000461	0.0002967
9#Non-STEMoccup	-0.0008101	0.0008176
9#STEMoccup	-0.00224***	0.0009117
10#Non-STEMoccup	-0.000371	0.0003975
10#STEMoccup	-0.0009687**	0.0004417

<i>Distance from home to the nearest main road</i>		
3#Non-STEMoccup	-0.0000645	0.0001141
3#STEMoccup	0.0000854	0.0001297
4#Non-STEMoccup	-0.0004782	0.0003397
4#STEMoccup	0.0006151	0.0004304
5#Non-STEMoccup	-0.0050342*	0.0026958
5#STEMoccup	0.0062591***	0.0026586
6#Non-STEMoccup	-0.0193794**	0.0099493
6#STEMoccup	0.0233107***	0.0088441
7#Non-STEMoccup	-0.0926125**	0.0429847
7#STEMoccup	0.1057504***	0.0260915
8#Non-STEMoccup	-0.0072927	0.0111098
8#STEMoccup	-0.0019267	0.0120837
9#Non-STEMoccup	0.0856394**	0.0425502
9#STEMoccup	-0.0936102***	0.0288761
10#Non-STEMoccup	0.0392221**	0.0181304
10#STEMoccup	-0.0404838***	0.0100863
<i>Number of businesses</i>		
3#Non-STEMoccup	1.05e-08	1.95e-08
3#STEMoccup	2.93e-08	4.78e-08
4#Non-STEMoccup	7.79e-08	5.25e-08
4#STEMoccup	2.11e-07	1.32e-07
5#Non-STEMoccup	8.21e-07*	4.68e-07
5#STEMoccup	2.15e-06***	8.20e-07
6#Non-STEMoccup	3.16e-06*	1.83e-06
6#STEMoccup	7.99e-06***	3.00e-06
7#Non-STEMoccup	0.0000151**	7.80e-06
7#STEMoccup	0.0000362***	0.0000105
8#Non-STEMoccup	1.19e-06	1.90e-06
8#STEMoccup	-6.60e-07	4.11e-06
9#Non-STEMoccup	-0.000014*	7.71e-06
9#STEMoccup	-0.0000321***	0.0000111
10#Non-STEMoccup	-6.39e-06*	3.45e-06
10#STEMoccup	-0.0000139***	4.16e-06
<i>Number of restaurants and bars in a radius of km²</i>		
3#Non-STEMoccup	1.66e-06	4.10e-06
3#STEMoccup	-2.20e-06	6.27e-06
4#Non-STEMoccup	0.0000123	0.0000302
4#STEMoccup	-0.0000159	0.0000367
5#Non-STEMoccup	0.0001296	0.0002963
5#STEMoccup	-0.0001614	0.0003745
6#Non-STEMoccup	0.0004989	0.0011226
6#STEMoccup	-0.0006012	0.0013203

7#Non-STEMoccup	0.0023842	0.0054857
7#STEMoccup	-0.0027275	0.0058177
8#Non-STEMoccup	0.0001877	0.0005291
8#STEMoccup	0.0000497	0.0003315
9#Non-STEMoccup	-0.0022047	0.0050365
9#STEMoccup	0.0024144	0.0052711
10#Non-STEMoccup	-0.0010097	0.0023621
10#STEMoccup	0.0010441	0.0021712
<i>Average annual income per inhabitants in a municipality</i>		
3#Non-STEMoccup	-6.31e-07	8.23e-06
3#STEMoccup	-0.0000721	0.0001149
4#Non-STEMoccup	-4.68e-06	0.0000609
4#STEMoccup	-0.0005194	0.0003265
5#Non-STEMoccup	-0.0000493	0.000643
5#STEMoccup	-0.0052853***	0.0017738
6#Non-STEMoccup	-0.0001897	0.0024791
6#STEMoccup	-0.0196842***	0.0067799
7#Non-STEMoccup	-0.0009065	0.0117361
7#STEMoccup	-0.0892984***	0.0237326
8#Non-STEMoccup	-0.0000714	0.0009329
8#STEMoccup	0.0016269	0.0101731
9#Non-STEMoccup	0.0008382	0.0108717
9#STEMoccup	0.0790469***	0.0239265
10#Non-STEMoccup	0.0003839	0.0049832
10#STEMoccup	0.0341855***	0.009728
<i>% of cultural diversity</i>		
3#Non-STEMoccup	0.0000104	0.0000205
3#STEMoccup	-0.0000179	0.0000276
4#Non-STEMoccup	0.0000771	0.000071
4#STEMoccup	-0.0001286	0.000083
5#Non-STEMoccup	0.0008117	0.0006305
5#STEMoccup	-0.001309***	0.0003764
6#Non-STEMoccup	0.0031246	0.0025109
6#STEMoccup	-0.0048749***	0.0017133
7#Non-STEMoccup	0.0149321	0.0111124
7#STEMoccup	-0.0221154***	0.0056772
8#Non-STEMoccup	0.0011758	0.001739
8#STEMoccup	0.0004029	0.002547
9#Non-STEMoccup	-0.0138078	0.0101762
9#STEMoccup	0.0195766***	0.0049207
10#Non-STEMoccup	-0.0063239	0.004799
10#STEMoccup	0.0084663***	0.0025622
<i>People aged 65></i>		
3#Non-STEMoccup	1.84e-06	0.0000116

3#STEMoccup	0.0000565	0.0000886
4#Non-STEMoccup	0.0000136	0.0000817
4#STEMoccup	0.0004072*	0.0002531
5#Non-STEMoccup	0.0001433	0.0008588
5#STEMoccup	0.0041437***	0.0014085
6#Non-STEMoccup	0.0005518	0.0033519
6#STEMoccup	0.0154324***	0.0049985
7#Non-STEMoccup	0.0026369	0.015846
7#STEMoccup	0.0700101***	0.0164331
8#Non-STEMoccup	0.0002076	0.0013068
8#STEMoccup	-0.0012755	0.0080112
9#Non-STEMoccup	-0.0024383	0.0146819
9#STEMoccup	-0.0619729***	0.0166882
10#Non-STEMoccup	-0.0011167	0.0067425
10#STEMoccup	-0.0268015***	0.0065772
Population density		
3#Non-STEMoccup	4.23e-08	8.36e-08
3#STEMoccup	-5.36e-08	1.06e-07
4#Non-STEMoccup	3.14e-07	3.06e-07
4#STEMoccup	-3.86e-07	4.08e-07
5#Non-STEMoccup	3.30e-06	3.00e-06
5#STEMoccup	-3.93e-06	4.15e-06
6#Non-STEMoccup	0.0000127	0.00001
6#STEMoccup	-0.0000146	0.0000161
7#Non-STEMoccup	0.0000607	0.0000492
7#STEMoccup	-0.0000663	0.0000675
8#Non-STEMoccup	4.78e-06	7.24e-06
8#STEMoccup	1.21e-06	7.41e-06
9#Non-STEMoccup	-0.0000562	0.0000456
9#STEMoccup	0.0000587	0.0000627
10#Non-STEMoccup	-0.0000257	0.0000199
10#STEMoccup	0.0000254	0.000026
Match preferences - actual residential behaviour		
3#Non-STEMoccup	-0.0000386	0.0000885
3#STEMoccup	-0.0000315	0.0000564
4#Non-STEMoccup	-0.0002874	0.0002789
4#STEMoccup	-0.0002285	0.0001944
5#Non-STEMoccup	-0.030561	0.0028531
5#STEMoccup	-0.0023486	0.00167
6#Non-STEMoccup	-0.0119206	0.0094538
6#STEMoccup	-0.0088486	0.0057321
7#Non-STEMoccup	-0.0585788	0.0503853
7#STEMoccup	-0.0410172**	0.0207718

8#Non-STEMoccup	-0.0089754	0.0139235
8#STEMoccup	-0.0012231	0.0135437
9#Non-STEMoccup	0.05585	0.0495258
9#STEMoccup	0.0371002*	0.0206504
10#Non-STEMoccup	0.0270069	0.0256882
10#STEMoccup	0.0165973	0.0118459
<i>Living in a suburban environment (ref.: urban)</i>		
3#Non-STEMoccup	.0000578	.0001132
3#STEMoccup	-0.0002419	0.0005092
4#Non-STEMoccup	0.0004601	0.0002926
4#STEMoccup	-0.0014193	0.0018879
5#Non-STEMoccup	0.0054099**	0.0025685
5#STEMoccup	-0.0114683	0.0131776
6#Non-STEMoccup	0.0238338***	0.0063591
6#STEMoccup	-0.0343596	0.0349388
7#Non-STEMoccup	0.1500213***	0.0380511
7#STEMoccup	-0.1123725	0.0813355
8#Non-STEMoccup	0.1540804**	0.0787732
8#STEMoccup	0.0552042	0.0644109
9#Non-STEMoccup	-0.1797297***	0.0432332
9#STEMoccup	0.0786708	0.0558221
10#Non-STEMoccup	-0.1541336**	0.0722976
10#STEMoccup	0.0259866*	0.0146707
<i>Living in a rural environment (ref.: urban)</i>		
3#Non-STEMoccup	0.0002121	0.00039
3#STEMoccup	-0.000274	0.0005458
4#Non-STEMoccup	0.0013859	0.0011185
4#STEMoccup	-0.0016701	0.0019558
5#Non-STEMoccup	0.0130505*	0.0076138
5#STEMoccup	-0.0142962	0.0136505
6#Non-STEMoccup	0.0470866**	0.0210846
6#STEMoccup	-0.046046	0.0382604
7#Non-STEMoccup	0.2271141***	0.0727924
7#STEMoccup	-0.1753488*	0.0991321
8#Non-STEMoccup	0.1161659**	0.0556767
8#STEMoccup	0.032806	0.043992
9#Non-STEMoccup	-0.2334592***	0.065061
9#STEMoccup	0.14361*	0.0809892
10#Non-STEMoccup	-0.17155**58	0.0780611
10#STEMoccup	0.0612191*	0.0352574
<i>N</i>		
	420	
*** p < 0.01, ** p < 0.05, * p < 0.1		

3

Competition for talent: Retaining graduates in the Euregio Meuse-Rhine

This chapter is an extended version of: Hooijen, I., Meng, C., Reinold, J., & Siegel, M. (2017). Competition for talent: retaining graduates in the Euregio Meuse-Rhine. *European Planning Studies*, 25(12), 2212-2231. doi:10.1080/09654313.2017.1354976

This chapter is joint work with Julia Reinold, Christoph Meng and Melissa Siegel. We thank the anonymous referee and Frank Cörvers for the constructive feedback and comments. In addition, the authors would like to thank RWTH Aachen, FH Aachen, Universiteit Hasselt, Maastricht University and Zuyd University of Applied Science for supporting the implementation of our survey by inviting their students to participate. The Research Centre for Education and the Labour Market (ROA) of Maastricht University financially supported the implementation of the survey in this chapter.

Abstract

Graduates are considered a convenient source of human capital in today's knowledge based economy. It is therefore crucial to understand what drives their mobility intentions to retain larger numbers of graduates. This is particularly true for peripheral regions, which need to compete with economic centres that are assumed to be more attractive. This paper adds a euregional perspective to the existing literature on graduate migration by investigating whether or not students intend to stay in the Euregio Meuse-Rhine (EMR) after graduation. It takes into account the role of hard and soft locational factors, social factors as well as individual characteristics in shaping future graduates' (im)mobility preferences. Using survey data from 2015 from five higher education institutions in the EMR, this paper finds that (im)mobility intentions are determined by students' perceptions of the quality of life, openness and career opportunities in the euroregion. In addition, distance to the partner and other social ties such as family and friends influence (im)mobility intentions.

Keywords: Euroregion, prospective graduates, highly skilled migration, human capital, talent

JEL-codes: O18, O21, R23

3.1 Introduction

Universities play a substantial role in delivering human capital to regions (Glaeser et al., 2001), which is why graduates are regarded as the ideal highly skilled individual to retain. Graduates not only share their new-acquired knowledge in the labour market, but can also contribute to the regional economy by residing in the region, by enjoying local consumption goods and by socially participating in the society. Multiple factors contribute to graduates' decision to choose a certain residency (Venhorst and Cörvers, 2015; Faggian and McCann, 2009; Suter and Jandl, 2008). While hard factors such as labour market opportunities often show to be crucial in location decisions, soft locational factors such as the availability of amenities and social factors such as distance to friends and family receive increasing attention in migration theory (Musterd et al., 2016b; Sleutjes, 2013; Florida 2002, 2003).

Founded in 1976, the Euregio Meuse-Rhine (EMR) is among the oldest euroregions (Perkmann, 2003). It consists of five sub-regions covering three European countries: the Southern part of the Dutch Province of Limburg, the German Zweckverband Region Aachen, the German-Speaking Community of Belgium, and the Belgian provinces of Limburg and Liège (Euregio Maas-Rhein, 2013). In its current strategy, EMR2020, the Euregio Meuse-Rhine Foundation (2013) recognises the need to further integrate the euregional labour market and to prevent brain drain. There is a web of knowledge-leading educational institutions within the EMR. Graduates and the networks between universities, industries, and governments are a potential source to innovation and to regional development (Harris, 1997). The almost 100,000 students studying in the EMR (Stadt Aachen, n.d.) translate into an enormous potential of human capital. Hence, the integration of graduates into the euregional labour market is one way to reach the EMR's goals of a balanced labour market and the prevention of brain drain. The sub-regions of the EMR differ in labour supply and demand which, in search of employment, contributes to a larger pool of available jobs matching one's education. The EMR therefore potentially offers a larger economic functional search area (Centraal Bureau voor de Statistiek [CBS], 2017, 2015; Planbureau voor de Leefomgeving [PBL], 2015; Hensen, de Vries and Cörvers, 2009).

This chapter aims at answering the research question: What determines the preferences of prospective graduates to remain living in the Euregio Meuse-Rhine after graduation? Special attention is given to whether hard locational, soft locational or social factors are the main drivers motivating their preferences. The societal relevance of arriving at a better understanding of why graduates migrate can help make the EMR more attractive for graduates and facilitate their integration into the euregional labour market to foster economic growth and increase the region's competitiveness (Plöger and Weck, 2014). The sub-regions of the EMR show a mixed picture of demographic development. For example, the Belgian part of the EMR

shows a remarkable and positive population development, whereas the Southern part of the Dutch Province of Limburg experiences negative population growth (CBS, 2017). Retaining graduates can mitigate negative population developments, which pose serious challenges to some parts of the EMR (Elzermann and Bontje, 2011).

This paper uniquely extends the academic literature by adding a euregional dimension. Research on euroregions has experienced a recent upsurge. There is a substantial interest in cross-border cooperation and the factors conditioning its challenges and success (PBL, 2015; Medeiros, 2011; Perkmann, 2003). To the best of our knowledge, this is the first study that covers the (im)mobility preferences of prospective university graduates in a euregional perspective rather than studying it in a system of bordered national areas. We find that (im)mobility intentions are determined by individuals' perceptions of the quality of life, the openness (i.e. ethnic diversity, tolerance, and ease of making contacts with locals) and the career opportunities in the EMR. In addition, distance to the partner and other social ties influence prospective graduates' migration preferences.

The chapter is organized as follows. Section 3.2 describes the literature on the determinants of human migration. From this literature, we define six hypotheses regarding. Section 3.3 presents the data and methodology. Section 3.4 discusses the empirical results. Section 3.5 concludes the chapter.

3.2 Literature review and theoretic background

The determinants of human migration have been subject to research since the late 19th century. 'Conventional wisdom holds that migration is driven by geographical differences in income, employment and other opportunities' (Castles et al., 2014, p. 25). The move towards a knowledge-based economy results in an increasing global competition for human capital and encouraged many scholars to examine the determinants of highly skilled migration. The existing literature includes research on different groups of highly skilled migrants (Mahroum, 2000) from and within different countries (Venhorst, 2013). Since higher education graduates are considered a central source of human capital, many scholars have analysed the determinants of graduate migration in different European countries (Venhorst, 2013; Haapanen and Tervo, 2012; Sykes, 2012; Van Wissen et al., 2011; Venhorst et al., 2010; Faggian and McCann, 2009; Coniglio and Prota, 2008; King and Shuttleworth, 1995) and the United States (US) (Hansen, Ban, & Huggins, 2003). Despite the vast amount of literature on graduate migration, no specific theory explaining migration of recent or prospective graduates specifically has been developed.

Based on recent research, determinants of migration can be clustered in four factors: hard locational factors, soft locational factors, social factors, and individual characteristics. The four factors should not be seen as mutually exclusive, but rather

as complementary (Castles et al., 2014; Massey et al., 1993). Migration is in this sense caused by the interplay of economic, social, cultural and political factors.

Hard locational factors

Hard locational factors are the ‘traditional economic aspects’ (Sleutjes, 2013, p. 13). They are considered the main determinants of migration in traditional migration theories such as the functionalist neoclassical theory and historical-structuralist theories. While the neoclassical theory suggests that migration results from differences in labour supply and demand across regions and that the decision to migrate is based rationally on comparing the costs and benefits of migration (Arango, 2000; Massey et al., 1993; Todaro, 1969), the historical-structuralist approach holds that individuals are not free to choose to migrate due to structural limitations (Castles et al., 2014; De Haas, 2010). Both schools are criticized for not capturing the complexity of different factors determining migration sufficiently and for characterizing individuals as rather passive (Castles et al., 2014; De Haas, 2014; Arango, 2000). Focusing on graduate migration, the availability of jobs is usually considered the most important hard locational factor (Van Wissen et al., 2011). Economic factors furthermore have been found to play the most important role in retaining individuals in shrinking regions in Portugal (Guimaraes, Nunes, Barreira, & Panagopoulos, 2016). Not only facts regarding the economic situation, but also individual perceptions regarding labour market opportunities can influence mobility intentions (Davies, 2008; Pethe, Bontje, & Pelzer, 2009). A second hard locational factor playing a role in the choice of residence is the available transportation network because of accessibility of the workplace as well as low cost of the transportation (Lawton, Murphy, & Redmond, 2013). Thirdly, language is seen as a hard locational factor influencing migration decisions. Being proficient in the official language of the host country can be seen as a prerequisite for entering the labour force. This might be less true in work places where the lingua franca is English, for instance, in academia, international firms and organizations. Language skills are not only a prerequisite for work, but also for social life. Accordingly, individuals are more likely to move to a country or stay in a country if they speak the official language (Adserà & Pytliková, 2015; King & Shuttleworth, 1995).

Soft locational factors

In recent years, the focus of scholars shifted from hard to soft locational factors. Soft locational factors refer to the quality of a place, for instance the quality of life, the living environment and the availability of amenities including ‘lifestyle considerations such as geography, climate, leisure time activities, recreational and cultural opportunities’ (Hansen et al., 2003, p. 141). A prominent advocate of the role

of amenities is Richard Florida who established the theory of the creative class. He argues that in order for a place to be attractive for the creative class, it requires the presence of the so-called '3 Ts' (Florida, 2003, p. 10): technology, talent and tolerance. The theory of the creative class provides a popular explanation for migration and affects policies regarding economic development worldwide including EU policies (Nathan, 2015; European Commission, 2009). However, the theory is often criticised for not matching reality (Nathan, 2015) and for being based on US data only (Musterd and Gritsai, 2013). To address the latter, the Accommodating Creative Knowledge (ACRE) project tested the theory in 13 European cities. The project found that Florida's theory holds for a very limited number of European cities (Musterd and Gritsai, 2013). Furthermore, it shows 'that job opportunities and personal net-works [...], and not amenities, cultural environment, openness, diversity and tolerance, are decisive for attracting skilled workers' (Musterd and Gritsai, 2013, p. 354). The latter are found to play a larger role in retaining human capital in European cities (Musterd and Gritsai, 2013). These results underline that the role of soft locational factors is highly disputed. While some scholars argue that they play an important part in the choice of residence (Florida, 2003; Hansen et al., 2003), others contradict this view (Lawton et al., 2013; Musterd and Gritsai, 2013) or see soft locational factors as secondary factors in case hard locational factors of two places are very similar (Sleutjes, 2013). Many soft factors arguably have an effect on graduates' migration decisions. One prominent factor is the general living environment, which refers to housing and the natural environment. This is closely linked to the aesthetic appeal of a region, referring to urban and environmental attractiveness of a place. Urban attractiveness depends on the architecture and the number of historic buildings in a region, while environmental attractiveness concerns the proximity to nature (Malens and Van Woerkens, 2005). Beyond this, the way of life and the availability of cultural and social activities, for instance, the existence of leisure and sport facilities, museums, restaurants, cafes and bars, matter in determining graduate migration choices. The role of these factors in migration decisions is often attributed to certain individual characteristics such as age. Younger migrants are expected to see a higher value in these aspects (Florida, 2002a). Some scholars even argue that the future of a place depends on its attractiveness (Glaeser et al., 2001). One should note that whether or not an individual perceives a place as attractive depends on subjective evaluations and different lifestyles (Castles et al., 2014; Sleutjes, 2013; Servillo, Atkinson, & Russo, 2012; Pethe et al, 2009; Davies, 2008).

Social factors

Besides hard and soft locational factors, social factors are important in determining graduates' migration behaviour (Pethe et al., 2009). Sykes (2012) finds that being close to one's family, friends and personal relationships plays an important role in

graduates' decisions to migrate. This assumption is confirmed by Sleutjes (2014, p. 13) who states that 'the presence of family members or friends, [or] following a partner, [...] are important reasons for choosing a place of residence'. Personal links 'connect people with certain places, including places [...] where they were born, where they have friends, where their family is living and where they studied' (Musterd and Gritsai, 2013, p. 348).

Individual characteristics

Individual characteristics also determine the decision to migrate (Lee, 1966). Several studies conclude that with increasing age mobility decreases. While younger individuals are more likely to move in search of their first job or a partner, older individuals are more likely to settle down because of family and accept more permanent jobs (Van Wissen et al., 2011; Faggian, McCann, & Sheppard, 2007). Moreover, female graduates are assumed to be more mobile than male graduates because they migrate for employment possibilities as a result of possible gender discrimination (Venhorst et al., 2010; Coniglio & Prota, 2008; Faggian et al., 2007). In addition, research shows that university graduates are more mobile than graduates from universities of applied science and that, the field of study influences graduate mobility as it determines the extent to which jobs are available in the region. For instance, graduates from the field of economics are arguably more flexible than graduates of the field of healthcare (Van Wissen et al., 2011; Sauermaann, De Grip, & Fouarge, 2010; Venhorst et al., 2010). Given our research population, higher education graduates, one has to distinguish between foreign and domestic graduates and between students studying in their home region and those studying away from home. Foreign graduates and students studying away from home are more likely to migrate after graduation (Haapanen & Tervo, 2012; Venhorst et al., 2010). One explanation is that 'subsequent migration is highly correlated with previous migration behavior' (Faggian et al., 2007, p. 537). Moreover, having work experience abroad increases the propensity to move (King & Shuttleworth, 1995). Differences in mobility behaviour are related to the concept of 'home preference' (De Haas, 2011, p. 21): 'most people, given the choice, prefer to stay at home' (De Haas, 2014, p. 25). Otherwise, migration rates would be much higher, taking into consideration the world-wide economic inequalities. This assumption underlines the role of human agency, which has been downplayed by traditional migration theory (De Haas, 2014). De Haas (2014, p. 33) defines 'human mobility as peoples' capability to choose where to live'. It is important to stress that individuals also have the option not to move. This choice is called 'voluntary immobility' (De Haas, 2014, p. 26). Another concept which is closely related to that of the 'home preference' is that of 'regional familiarity', which can be acquired by residing and studying in a certain region (Venhorst, 2013). Venhorst (2013, p. 118) argues that

‘regional familiarity [...] appears to play an important role in work and/or residential destination choice’ of recent graduates.

Hypotheses

The main aim of this study is to identify the major determinants of prospective graduates’ migration intentions in a euregional context. Based on the reviewed literature, along the four factors distinguished above, we formulate the following hypotheses. The ordering does thereby not have implications for the relative importance of the individual hypotheses. This is because migration decisions are usually the result of a complex set of interrelated factors, which may differ from case to case.

Hard locational factors

(1) A positive perception of career opportunities and the transport networks within the EMR increases the likelihood that prospective graduates intend to stay (immobility) in the EMR after finishing education.

Soft locational factors

(1) A positive perception of the quality of life in the EMR increases the likelihood that prospective graduates intend to stay (immobility) in the EMR.

(2) A positive perception of the openness in the EMR increases the likelihood that prospective graduates intend to stay (immobility) in the EMR.

Social factors

(1) With increasing distance to relatives, friends and partner, the likelihood that prospective graduates intend to stay (immobility) in the EMR decreases.

Individual characteristics

(1) We expect mobility intention to decrease with increasing age, to be higher for female graduates, to increase with an increasing level of education and to be higher for university graduates than for graduates from universities of applied sciences.

(2) We hypothesise that graduates who were born in the EMR are more likely to stay (immobility) and that mobility increases with previous migration experience.

3.3 Data and methodology

We make use of multistage cluster sampling. First, we specifically select higher education institutions in the EMR through a defined random sampling strategy. Second, from within these higher education institutions in the EMR, we select the largest institutions to participate. In doing so, we aim to have a representative sample of institutes representing the EMR (O'Leary, 2010; Babbie, 2008). This study uses survey data from 2015 collected at different faculties from five higher education institutions in the EMR to learn more about (im)mobility intentions of prospective graduates. The survey is carried out by Maastricht University in cooperation with several faculties from the five institutes of higher education. A possible shortcoming is that not all faculties of the five higher education institutions take part in the survey. For example, on the one hand, students in science, mathematics, computing and students in engineering, manufacturing and construction form the largest share of respondents. However, this is not surprising considering that most of the students taking part in the survey, study at the FH Aachen or RWTH Aachen, with the latter university being the largest university in the EMR. To compare, almost 44.000 students studied at the RWTH Aachen during the academic year 2015-2016, whereas almost 17.000 students studied at Maastricht University in the academic year 2015-2016 (RWTH Aachen University, 2016; Maastricht University, 2015).³⁷ On the other hand, the sample misses students from for example agricultural studies and shows a under representativity of economic students. This creates a possible shortcoming, because previous research shows that students from some study fields, such as agriculture and economics are more mobile compared to other study fields (Hooijen & Cörvers, 2019). Therefore, we might miss out on a representative overview of (im) mobility flows. This could lead to a coverage error as the list we draw the sample from is incomplete. Furthermore, we acknowledge a possible non-response bias, because the characteristics of those who participate in the survey and those who decline participation are might be distinct (O'Leary, 2010).

Students are approached via the institute of higher education and through their student email account. The data collected between June and October 2015 includes information on 3328 individuals (RWTH Aachen = 1.926, FH Aachen = 409, UHasselt = 307, Maastricht University = 346, Zuyd Hogeschool = 340). Note that almost 100,000 students are studying in the EMR (Stadt Aachen, n.d.), which means that we focus on less than 5 percent of the students in the EMR. Therefore, the results are not generalizable for the whole study population in the EMR. In a next step, we

³⁷ The number of students being enrolled at these institutes is increasing. More than 45.000 students are enrolled at the RWTH Aachen in the winter semester of 2019-2020. Almost 19.000 students are enrolled at Maastricht University during the academic year 2019-2020 (Maastricht University, 2020; RTWH Aachen University, 2020).

make use of systematic sampling as we target prospective graduates, that is to say students who are in the final phase of their studies assuming that they are more likely to have thought about their future residency compared to students at the beginning of their studies (O’Leary, 2010). This restricts our sample to 1211 individuals (RWTH Aachen = 694, FH Aachen = 115, UHasselt = 88, Maastricht University = 117, Zuyd Hogeschool = 197).

Variables

The dependent variable investigated in this study has three possible outcomes, indicating if students intend (1) to stay in the EMR after graduation, (2) leave the EMR after finishing higher education or (3) are uncertain about their future residency. The independent variables used to explain the mobility intentions of graduates are divided into four groups: hard locational factors, soft locational factors, social factors, and individual characteristics.

Hard locational factors

We include four independent variables related to respondents’ perceptions or subjective evaluations of hard locational factors. Two binary variables indicate if respondents have a positive view of the career opportunities and the transport network in the EMR. A third binary variable specifies if respondents regard proficiency in the official language important when choosing their residency. Furthermore, English language proficiency is used as a binary variable.

Soft locational factors

Additionally, we account for three different independent variables referring to respondents’ perception of soft locational factors. Respondents are asked to indicate their view on soft locational factors in the region where they study, namely the living environment, cultural and social activities, aesthetic appeal of the region, way of life, ethnic diversity, tolerance, and ease of making contacts with locals. Based on a factor analysis, these variables are clustered into two variables. The first, which we refer to as the ‘view on the quality of life’ refers to the living environment, cultural and social activities, the aesthetic appeal of the region, and the way of life. The second combines ethnic diversity, tolerance, and ease of making contacts with locals and is called the ‘view on the openness’. Both are binary variables indicating if respondents have a positive view. Moreover, we consider if respondents find the quality of life important when choosing the place of residence. Based on a factor analysis, the binary variable combines the importance of the living environment, cultural and social activities, the aesthetic appeal of the region, and the way of life.

Social factors

Two independent variables refer to the role of social factors in graduates' migration decision. First, respondents are asked to indicate how important friends and family are when choosing their residency. Based on a factor analysis the answers from both questions are merged into one binary variable called 'social ties' indicating if respondents find social ties important in choosing their place of residence. Second, the survey contains information on the relationship status of the respondents and where their partner lives. This information is merged into one variable called 'distance to partner'. There are four possible categories, namely the reference category 'living together with the partner', 'partner living in the same city or region', 'partner living in the same or another country' and 'no partner'.

Individual characteristics

Individual aspects relate to gender; age; place of birth and residence, distinguishing between places inside and outside the EMR. In addition, we use individual data related to education. We consider if respondents study at a university or a university of applied sciences. Moreover, we take into account if respondents pursue a Bachelor's degree, a Master's degree, or a PhD, whereby Bachelor's students serve as the reference group. Additionally, we distinguish between the best 25 percent of students and the rest, based on their current grade point average. Furthermore, fields of study is taken into consideration. We distinguish between social sciences; business and economics; law; science, maths and computing; engineering, manufacturing and construction; health and welfare; as well as behavioural science and life science. A binary variable specifies if respondents plan to continue studying or do a PhD or if they have other plans. Three independent variables are linked to the previous migration of the respondents: First, a continuous variable indicates how often the respondents changed their place of residence since their 16th birthday. Second, a binary variable shows if respondents moved for their studies. Third, a categorical variable specifies if respondents have working experience abroad, have study experience abroad or if they have other experiences abroad.

Methodology

The analysis is divided into two parts. To start, we distinguish between stayers, leavers and uncertain respondents, exploring differences between the three groups based on a descriptive analysis of individual characteristics factors, the importance of different locational factors and the respondents' perceptions of these factors in the EMR. In this preliminary analysis, we use chi-squared and one-way analysis of variance (ANOVA) tests to see whether there are differences between the combination of all

three outcomes stay, leave and being uncertain based on these factors (see Table 3.1). In the second part, we estimate a multinomial logistic regression model using a stepwise approach. We distinguish between four different groups of variables throughout the models: (1) individual characteristics, (2) hard locational factors, (3) soft locational factors, (4) social factors.

3.4 Results

Descriptive analysis

Examining the (im)mobility intentions of prospective graduates studying in the EMR descriptively, we find that the share of respondents intending to stay is the smallest (26.75 percent, N=324) compared to the share of those intending to leave (32.62 percent, N=395) and the share of those who are still uncertain (40.63 percent, N=492). This shows that even towards the end of their studies the largest share has not made up their mind about their plans after graduation. The most important reason for respondents' (im)mobility intentions are work (50.73 percent), the living environment (14.64 percent) and the partner (17.15 percent). 35.19 percent of potential stayers intend to move internally. In most cases, they intend to move within the sub-region where they currently live. The same result holds for the uncertain respondents. If they stay, they are more likely to remain living in the same sub-region. Hence, there is very little movement between the individual sub-regions within the EMR. In addition, the largest share of respondents who intend to move within the EMR plan to work or pursue a PhD after graduation (77.19 percent). A possible explanation for their internal movement is that they will be able to afford better housing once they earn money.

Table 3.1 presents descriptive statistics of some variables of interest. Regarding individual characteristics, the average age is the only variable, which does not show statistically significant differences between the three groups, which might relate to our selected group of young people. Comparing stayers, leavers and uncertain individuals, we find in line with earlier research that among stayers there are larger shares of respondents who have been born in the EMR (62.96 percent), who are living inside the EMR while studying (98.15 percent), who have a partner (78.09 percent) and who are pursuing a Bachelor's degree (49.38 percent). In contrast, larger shares of leavers moved before for studying (83.80 percent) and belong to the top 25% of students (30.08 percent). On average, leavers have more previous migration experience (2.08 times). Among the uncertain group, we find the largest share studying at university level (75.70 percent), pursuing a Master's degree (56.91 percent) or a doctorate (8.33 percent).

Table 3.1 Descriptive Statistics of Variables of Interest

	Leavers	Stayers	Uncertain	All Respondents	
Background information					
Mean age**	24.74	24.95	25.20	24.98	
Female***	46.08 %	53.70 %	41.87 %	46.41 %	
Born in EMR***	18.25 %	62.96 %	27.64 %	34.02 %	
Living in EMR***	71.39 %	98.15 %	84.96 %	84.06 %	
Moved for studies***	83.80 %	52.78 %	78.46 %	73.33 %	
Mean previous migration***	2.08	1.42	1.76	1.72	
Partner***	69.11 %	78.09 %	58.74 %	67.30 %	
University***	75.70 %	65.43 %	78.86 %	74.24 %	
Degree***					
	BA	39.75 %	49.38 %	34.76 %	40.30 %
	MA	53.92 %	45.06 %	56.91 %	52.77 %
	PhD	6.33 %	5.56 %	8.33 %	6.94 %
Top 25 %*	30.08 %	22.61 %	26.72 %	26.73 %	
Important when choosing residency					
Social ties***	66.58 %	83.33 %	76.02 %	74.90 %	
Quality of life**	91.14 %	85.19 %	87.20 %	87.94 %	
Openness**	68.35 %	58.95 %	67.28 %	65.40 %	
(International) Transport	54.68 %	47.22 %	51.22 %	51.28 %	
Career opportunities**	84.05 %	81.17 %	88.62 %	85.14 %	
Language proficiency***	57.72 %	72.22 %	59.55 %	62.35 %	
Good view of factor in EMR					
Quality of life***	75.95 %	92.90 %	88.01 %	85.38 %	
Openness***	70.13 %	84.88 %	81.71 %	78.78 %	
(International) Transport**	61.27 %	70.06 %	66.06 %	65.57 %	
Career opportunities**	34.18 %	44.14 %	39.02 %	38.81 %	
N	395	324	492	1211	

Legend: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: We apply Chi²- tests for binary variables, one-way analysis of variance (ANOVA) tests, and a subsequent Bartlett's tests for continuous variables.

Additionally, Table 3.1 presents the shares of respondents, who rate various locational factors important when choosing their residency. A relative larger share of stayers considers social ties (83.33 percent) and proficiency in the official language (72.22 percent) as important. A relative larger share of leavers considers the quality of life (91.14 percent), openness (68.35 percent) and transport network (54.68 percent) important. A relative larger share of uncertain respondents finds career opportunities (88.62 percent) important. With the exception of the importance of the transportation network, stayers, leavers and uncertain individuals differ significantly from each other.

Finally, Table 3.1 shows the shares of stayers, leavers and uncertain individuals, who have a positive view on different locational factors in the EMR. As expected, we find that stayers have the most positive and leavers the least positive views on all four categories: quality of life, openness, transport network and career opportunities. The difference in proportion between all three groups is statistically significant. There are no statistically significant differences between the individual sub-regions of the EMR regarding the descriptive statistics.

Regression analysis

To analyse the impact of the different determinants simultaneously, we estimated a multinomial logistic regression on the full sample of students from all five institutions of higher education.³⁸ To test if the patterns of (im)mobility intentions of graduates are the same on all sides of the border, we also run logistic regressions for each EMR sub-region separately. We find no notable differences between the individual sub-regions of the EMR (see Appendix A3.1). This points to the interesting fact that the same processes play a role in determining the migration preferences of prospective graduates on all sides of the border. Hence, programmes at a euregional level to retain prospective graduates to the euroregion can be recommended.

Table 3.2 presents the results of the multinomial logistic regression, including relative risk ratios (RRR), robust standard errors (RSE) and statistical significance of the independent variables. The baseline for the dependent variable is the intention to leave the EMR after finishing education.

³⁸ We test the Independence of Irrelevant Alternatives assumption (IIA) of the multinomial logit model applying a Hausman-McFadden test. We run the full model including all three outcomes (leave/stay/uncertain) against the restricted model in which we exclude the group of respondents indicating to be uncertain whether to move or not. The results of the test show that the full model is the correct specification (Cameron & Trivedi, 2009).

Table 3.2 Stepwise Models Comparing Migration Intentions of Stayers and Leavers (Reference Category)

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	RRR	RSE	RRR	RSE	RRR	RSE	RRR	RSE	RRR	RSE
<i>Individual characteristics</i>										
Female	1.34*	0.23	1.30	0.24	1.23	0.24	1.14	0.22	0.91	0.19
Age	1.08***	0.03	1.13***	0.04	1.13***	0.04	1.13***	0.04	1.10**	0.04
Living in the EMR	13.03***	5.77	15.79***	7.17	18.1***	8.38	18.50***	8.69	19.78***	9.54
Born in the EMR	4.43***	0.97	4.33***	1.00	4.25***	0.99	4.39***	1.03	3.89***	0.93
Not moved for studies	1.90***	0.46	1.69**	0.45	1.81**	0.49	1.74**	0.47	1.72**	0.48
Previous migration	0.95	0.07	1.00	0.08	1.04	0.08	1.06	0.08	1.09	0.09
<i>Institution</i>										
University	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
University of applied sciences	1.43	0.36	1.46	0.37	1.58*	0.42	1.39	0.38	Ref.	Ref.
<i>Degree</i>										
Bachelor's	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Master's	1.48*	0.35	1.57*	0.38	1.53*	0.37	1.44	0.36	Ref.	Ref.
PhD	0.65	0.31	0.73	0.35	0.64	0.31	0.51	0.25	Ref.	Ref.
Top 25% students	0.78	0.16	0.84	0.17	0.80	0.17	0.76	0.16	Ref.	Ref.
Job as stepping stone towards future career	1.19	0.23	1.16	0.23	1.19	0.24	1.18	0.24	Ref.	Ref.
<i>Field of studies</i>										
Social Sciences	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Business & Economics	1.43	0.53	1.39	0.54	1.51	0.59	1.68	0.68	Ref.	Ref.
Law	2.57*	1.26	2.42*	1.24	2.84**	1.48	3.13**	1.72	Ref.	Ref.
Science, Maths & Computing	1.45	0.51	1.23	0.45	1.39	0.52	1.60	0.61	Ref.	Ref.
Engineering, Manufacturing & Construction	1.08	0.35	0.98	0.33	1.07	0.37	1.04	0.37	Ref.	Ref.
Health & Welfare	3.17**	1.50	2.85**	1.40	4.10***	2.05	3.97***	2.03	Ref.	Ref.
Behavioural Science & Life Science	1.53	0.75	1.39	0.69	1.60	0.81	1.77	0.91	Ref.	Ref.

Experience abroad									
<i>None</i>	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
<i>Working</i>	0.43***	0.14	0.49**	0.16	0.51**	0.17	0.52**	0.17	0.17
<i>Schooling</i>	0.74	0.18	0.76	0.18	0.72	0.18	0.73	0.19	0.19
<i>Other</i>	0.49**	0.16	0.54*	0.18	0.58	0.19	0.62	0.22	0.22
Continue studying	2.15***	0.45	2.19***	0.46	2.20***	0.47	2.34***	0.52	0.52
Hard Locational Factors									
View on the career opportunities			1.66***	0.32	1.41*	0.28	1.42*	0.29	0.29
View on the transport system			1.32	0.25	1.04	0.20	0.96	0.19	0.19
Language proficiency important			1.65***	0.31	1.68***	0.33	1.69***	0.34	0.34
Fluent in English			0.93	0.20	0.94	0.21	1.05	0.24	0.24
Soft Locational Factors									
Quality of life important					0.56**	0.15	0.53**	0.15	0.15
View on the quality of life in the EMR					3.24***	0.92	2.94***	0.86	0.86
View on the openness in the EMR					1.91***	0.45	2.15***	0.52	0.52
Social Factors									
Distance to partner									
<i>Living together</i>							Ref.	Ref.	Ref.
<i>Same city/ region</i>							0.91	0.23	0.23
<i>Same/ other country</i>							0.23***	0.08	0.08
<i>No partner</i>							0.50***	0.12	0.12
Social ties important							2.07***	0.47	0.47
Constant	0.00***	0.00	0.00***	0.00	0.00***	0.00	0.00***	0.00	0.00
<i>N</i>	1172	1172	1172	1172	1172	1172	1172	1172	1172
Mcfadden's Pseudo R2	10.1%	12.0%	12.8%	14.6%	14.6%	17.4%	17.4%	17.4%	17.4%
AIC	2310.7	2322.9	2319.8	2285.4	2285.4	2230.7	2230.7	2230.7	2230.7
BIC	2381.6	2545.8	2583.2	2579.2	2579.2	2565.1	2565.1	2565.1	2565.1

*p < 0.10, **p < 0.05, ***p < 0.01

Note: base outcome: leave

Table 3.2 (continued) Stepwise Models Comparing Migration Intentions of Leavers (Reference Category) and Undecided

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	RRR	RSE								
<i>Individual characteristics</i>										
Female	0.92	0.13	0.90	0.14	0.89	0.14	0.84	0.14	0.87	0.15
Age	1.07***	0.03	1.08***	0.03	1.09***	0.30	1.08***	0.03	1.09***	0.04
Living in the EMR	1.87***	0.34	2.04***	0.39	2.11***	0.41	2.12***	0.42	2.25***	0.46
Born in the EMR	1.49**	0.29	1.47*	0.30	1.47*	0.30	1.49*	0.31	1.41	0.30
Not moved for studies	1.11	0.23	1.09	0.25	1.11	0.26	1.09	0.26	1.05	0.25
Previous migration	0.92	0.05	0.95	0.05	0.96	0.06	0.96	0.06	0.99	0.06
Institution										
University	Ref.									
University of applied sciences	1.09	0.24	1.11	0.24	1.11	0.24	1.15	0.26	1.08	0.25
Degree										
Bachelor's	Ref.									
Master's	1.51**	0.30	1.52**	0.30	1.52**	0.30	1.47*	0.30	1.51**	0.32
PhD	1.18	0.46	1.19	0.48	1.19	0.48	1.06	0.42	1.16	0.47
Top 25% students	0.83	0.14	0.85	0.14	0.85	0.14	0.84	0.15	0.86	0.15
Job as stepping stone towards future career	0.98	0.16	0.95	0.15	0.95	0.15	0.98	0.16	1.00	0.17
Field of studies										
Social Sciences	Ref.									
Business & Economics	1.38	0.46	1.38	0.46	1.38	0.46	1.42	0.48	1.46	0.51
Law	1.91	0.84	1.88	0.84	1.88	0.84	20.7	0.95	1.99	0.96
Science, Maths & Computing	1.26	0.40	1.19	0.38	1.19	0.38	1.27	0.42	1.30	0.43
Engineering, Manufacturing & Construction	1.08	0.32	1.05	0.32	1.05	0.32	1.11	0.35	1.05	0.33
Health & Welfare	1.50	0.68	1.41	0.65	1.41	0.65	1.79	0.85	1.66	0.80
Behavioural Science & Life Science	1.80	0.78	1.72	0.75	1.72	0.75	1.87	0.83	1.91	0.85

Experience abroad									
<i>None</i>	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
<i>Working</i>	0.78	0.20	0.78	0.20	0.81	0.20	0.81	0.20	0.21
<i>Schooling</i>	0.77	0.14	0.75	0.14	0.73	0.14	0.68*	0.14	0.14
<i>Other</i>	0.76	0.18	0.75	0.19	0.79	0.20	0.77	0.20	0.20
Continue studying	1.38*	0.24	1.38*	0.24	1.36*	0.24	1.41*	0.24	0.26
Hard Locational Factors									
View on the career opportunities			1.23	0.19	1.11	0.18	1.11	0.18	0.18
View on the transport system			1.22	0.18	1.03	0.16	0.99	0.16	0.16
Language proficiency important			1.08	0.16	1.07	0.16	1.03	0.16	0.16
Fluent in English			1.03	0.18	1.04	0.19	1.06	0.19	0.20
Soft Locational Factors									
Quality of life important					0.70	0.17	0.67*	0.16	0.16
View on the quality of life in the EMR					2.09***	0.44	2.01***	0.43	0.43
View on the openness in the EMR					1.43*	0.27	1.51**	0.27	0.30
Social Factors									
Distance to partner									
<i>Living together</i>					Ref.		Ref.		Ref.
<i>Same city/ region</i>					1.28		1.28		0.30
<i>Same/ other country</i>					0.73		0.73		0.17
<i>No partner</i>					1.71***		1.71***		0.34
Social ties important					1.65***		1.65***		0.28
Constant	0.13***	0.09	0.07***	0.06	0.05***	0.04	0.03***	0.03	0.02
<i>N</i>	1172	1172	1172	1172	1172	1172	1172	1172	1172
Mcfadden's Pseudo R2	10.1%	12.0%	12.8%	14.6%	17.4%				
AIC	2310.7	2322.9	2319.8	2285.4	2230.7				
BIC	2381.6	2545.8	2583.2	2579.2	2565.1				

*p < 0.10, **p < 0.05, ***p < 0.01

Note: base outcome: leave

Model 1 includes information on the individual characteristics that are likely to influence the (im)mobility intention. The results show that respondents are more likely to stay with increasing age, if they are living in the EMR during their studies and if they were born in the EMR ($p < 0.01$). Similarly, not having moved for one's studies is associated with an increased probability of staying in the region. As expected, these results are consistent throughout the different models for the group of stayers relative to the group of leavers. These results can be seen as evidence for the 'home preference', the effect of 'regional familiarity' and the hypothesis that people who have moved previously, are more likely to move again. People who were born in the EMR and reside there while studying are arguably more familiar with the region and are, therefore, more likely to stay than others. Other than expected, the estimations do not reveal a gender effect. A possible explanation for this is that while studying, respondents are not aware of possible gender discriminations in the labour market yet, or more optimistic, gender discrimination (or perception of discrimination) is less of a problem in the EMR.

Model 2 adds information regarding education and work experience. Other than expected, we find that students studying for a Master's degree ($p < 0.10$) are more likely to stay compared to Bachelor students. However, this effect is only marginally significant and changes when adding additional variables in the following models. The same is true for respondents studying law ($p < 0.10$) or health and welfare ($p < 0.05$) relative to students of the social sciences. This is in line with earlier research (Venhorst et al., 2010, p. 524) showing that graduates of the field of health care are less flexible and mobile. Respondents with experiences abroad, such as work ($p < 0.01$) or study experiences ($p < 0.05$), are less likely to remain living in the EMR after graduation. Those planning to continue studying are twice as likely to remain living in the EMR ($p < 0.01$).

Model 3 adds a set of hard locational factors. Respondents who have a good view on career opportunities and respondents who find the language proficiency important, are 65 percent more likely to stay relative to those who have a negative view on career opportunities or do not find language skills important when choosing their place of residence ($p < 0.01$). Other than expected, the estimations do not reveal any effects of the transport system and proficiency in the English language.

In Model 4, we add soft locational factors. Our first two factors, the importance attached to the quality of life when choosing one's residency and the view on the quality of life in the EMR, need to be interpreted together. We find that respondents who find the quality of life important in choosing their residency are generally 50 percent less likely to stay ($p < 0.05$). At the same time, however, we find that students with a positive view on the quality of life are on average three times more likely to stay relative to the ones with a negative view ($p < 0.01$). This indicates that students who find the quality of life important and have a positive view on the EMR with respect to this aspect are most likely to stay whereas students who find the quality of

life important but have a negative view are most likely to leave.³⁹ In addition, students with a positive view on the openness in the EMR are on average three times more likely to stay relative to the ones with negative views ($p < 0.01$). This result regarding the openness is in line with the findings of the ACRE project, which concludes that factors such as openness, tolerance and diversity play a role in retaining individuals in Europe (Musterd and Gritsai, 2013).

Model 5 finally adds social factors as a last group of variables. In comparison to respondents living together with their partner, those who have a partner living further away in the same or in another country are more likely to leave ($p < 0.01$). The same is true for the respondents without a partner ($p < 0.01$). In addition, we find that respondents who find social ties important in choosing their residency are two times more likely to stay relative to those who do not ($p < 0.01$). As the effect of the partner variable depends on where the partner lives, we suggest that the social ties variable is subject to similar circumstances. Looking at the shares of respondents who rate social ties important considering their place of birth and migration intention, we find that 53.53 percent of the respondents who consider social ties important were born in the EMR and intend to stay after graduation. Similarly, 37.38 percent were born elsewhere and intend to leave. These findings can be interpreted as an indicator that respondents prefer living near their social ties. The significance of the variables remains unchanged throughout the five different models. Yet, the RRR of the respondents holding a Master degree loses significance in the full model.

In addition, our multinomial logistics regression compares the uncertain group to the group intending to leave. Again, the results are similar across all five models specified which is why we focus on the results of the full model here.⁴⁰ The results indicate that respondents are more likely to be uncertain with increasing age ($p < 0.01$), if they are currently living in the EMR ($p < 0.01$), if they are pursuing a Master's degree ($p < 0.05$) and if they intend to continue studying ($p < 0.10$). Moreover, having a good view of the quality of life and the openness in the EMR is associated with an increased likelihood of being uncertain ($p < 0.01$ and $p < 0.05$ respectively). Similarly, respondents who are not in a relationship and who rate social ties important when choosing their residency are also more likely to be uncertain ($p < 0.01$). Finding the quality of life important when choosing one's residency is associated with an increased probability of intending to leave. This effect is however only marginally significant ($p < 0.01$). An important difference between the models comparing leavers relative to stayers and the models comparing leavers relative to uncertain respondents is that in the latter

39 Adding an interaction variable between the importance attached to the quality of life and the view on the quality of life in the EMR confirm these findings.

40 There is one exception: While in general respondents who were born in the EMR are more likely to be uncertain about their future residency, the variable loses its statistical significance when adding social factors in Model 5.

variables referring to the field of studies, previous migration experience, the view on career opportunities and language proficiency are not found to have a statistically significant effect. Interestingly, the measurements testing the goodness of fit between the different models implies that Model 4 including the hard locational factors has less explanatory potential as compared to the models including soft and social factors. This contradicts the literature on graduate migration, which considers hard locational factors to be the dominant factor in location decisions. The overall result, however, indicates that it is the interplay between the different factors explaining mobility intentions.

3.5 Conclusion and discussion

As the competition for talent increases, it becomes more and more important to understand what influences (im)mobility decisions of prospective graduates as a convenient source of human capital. In this chapter, we analyse the determinants of students' (im)mobility intentions. The innovative aspect of this chapter is that it applies a euregional perspective.

Even towards the end of their studies, the largest share of future graduates is still uncertain about their future residency. Of those who have decided already, a larger share intends to leave the EMR after finishing education. We find that (im)mobility intentions of prospective graduates depend on a variety of hard locational, soft locational, social and individual factors. These findings are in line with previous studies, which suggest that (im)mobility is caused by the interplay of various economic, social, cultural and political factors. Furthermore, distance to the partner and other social ties such as family and friends influence (im)mobility intentions of students studying in the EMR. In addition, (im)mobility intentions are influenced by individual perceptions of the quality of life, the openness and the career opportunities in the EMR. If students have a good view on these factors, they are more likely to stay in the EMR. In comparison, soft and social factors seem to have more explanatory power in the models than hard factors only. Our findings are in line with the ACRE project (Musterd and Gritsai, 2013), which concludes that soft factors such as openness and tolerance are important factors in retaining individuals in the European context. The effect of individual characteristics, particularly the place of birth and place of residence underline the importance of the so-called 'home preference' and 'regional familiarity' in choosing one's residency. Other factors, which, were expected to impact graduate migration intentions, such as the transport system, gender, the level of education, and the type of higher education institution were not found to have an effect.

The findings are consistent between the individual sub-regions pointing to the interesting fact that the same processes play a role in determining the migration preferences of prospective graduates on all sides of the border. Hence, programmes at a euregional level to retain prospective graduates to the euroregion can be recommended.

The studied sample does not represent the whole study population in the EMR. Therefore, the results are not generalizable. However, the findings give a first direction to formulating additional policy recommendations to retain larger numbers of graduates in the EMR. First, one should encourage students to move to the EMR instead of commuting to university from outside the EMR. As our results show, respondents who do not live inside the EMR while studying are extremely unlikely to intend to live inside the EMR in the future. One suggestion is to provide attractive and affordable housing for students. In addition, universities should encourage their Bachelor's students to continue studying at the same university. The longer they live and study in the region, the greater their 'regional familiarity' becomes and the more likely they are to stay after finishing education. This is particularly true for students who did not live in the EMR before studying. Generally, more of an effort can be made to tie students to the region if they come from outside the EMR. We acknowledge that this is a difficult undertaking considering that the results of this study underline the importance of individual perceptions on hard and soft locational factors in the retention of graduates. However, we suggest that one possible way to achieve this is to further eliminate border barriers and thereby improve the quality of life. Moreover, providing students with more information on career opportunities (e.g. euregional career events, volunteering activities) and opportunities related to the quality of life (e.g. cultural and leisure time activities) on all three sides of the borders might be a good idea to influence graduates' perceptions of the EMR. Given that nearly 90 percent of the students in our population indicate that the quality of life is an important aspect when deciding on the place of residence, keeping up the quality of life in the EMR on the high level currently achieved (Agit, n.d.; DGStat, n.d.; Zuidlimburg, n.d.) is crucial for retaining graduates in the EMR. It is relevant to monitor such events to better understand the effectiveness of such approaches.

The following chapter examines to what extent (im)mobility intentions of this study population are actually realised. This is relevant because (im)mobility does not necessarily take place directly after graduation and hence it does not reveal one's (im) mobility behaviour over time, which is relevant for regional development.

3.6 Appendix

To be able to compare the results across sub-regions, we compute logit models, presenting marginal effects. We are not able to compute a separate regression for

the EMR region in Belgium, because several variables are not estimable due to a low sample size. Note that, with the exception of three variables becoming marginally significant,⁴¹ excluding the Belgium region in the main model of this chapter would not alter the main results.

Table A3.1 Logit models comparing (im)mobility intentions of leavers and stayers for each EMR sub-region

	EMR	EMR excluding BE	South Limburg	Aachen region
<i>Individual characteristics</i>				
Female	-0.0196 (0.0369)	-0.0404 (0.0381)	0.0330 (0.0797)	-0.0288 (0.0452)
Age	0.0154** (0.00710)	0.0162** (0.00741)	0.00261 (0.00952)	0.0181* (0.00943)
Born in the EMR	0.221*** (0.0498)	0.199*** (0.0523)	0.168* (0.0952)	0.194*** (0.0637)
Not moved for study	0.119** (0.0511)	0.153*** (0.0581)	0.338*** (0.0604)	0.0712 (0.0757)
Previous migration	0.0118 (0.0144)	0.0142 (0.0148)	-0.00490 (0.0275)	-0.00592 (0.0191)
<i>Institution</i>				
University	Ref.	Ref.	Ref.	Ref.
University of applied sciences	0.0743 (0.0528)	0.0783 (0.0561)	0.261** (0.130)	0.0577 (0.0686)
<i>Degree</i>				
Bachelor's	Ref.	Ref.	Ref.	Ref.
Master's	0.0223 (0.0462)	0.00972 (0.0498)	0.0892 (0.122)	0.0415 (0.0566)
PhD	-0.115 (0.101)	-0.120 (0.105)		-0.0536 (0.115)
Top 25% students	-0.0696* (0.0411)	-0.0891** (0.0429)	0.0149 (0.0714)	-0.0792 (0.0517)
Job as stepping stone towards future career	0.0215 (0.0372)	0.0154 (0.0382)	-0.0215 (0.0998)	0.0132 (0.0454)
<i>Field of studies</i>				
Social Sciences	Ref.	Ref.	Ref.	Ref.
Business & Economics	0.141* (0.0786)	0.139* (0.0809)	0.123 (0.0875)	0.104 (0.113)

⁴¹ When excluding the Belgium region of the EMR from the main analysis, comparing leavers and stayers, the students that belong to the top 25% students are more likely to leave. Comparing leavers to the uncertain, those studying law or behavioural and life science, relative to students of the social sciences, are more likely to be uncertain.

Law	0.0982 (0.106)	0.139 (0.123)	0.0672 (0.0976)	
Science, Maths & Computing	0.121 (0.0753)	0.111 (0.0764)	0.271*** (0.0897)	0.0654 (0.0971)
Engineering, Manufacturing & Construction	0.0181 (0.0707)	0.0198 (0.0707)	-0.186** (0.0817)	0.00492 (0.0926)
Health & Welfare	0.188** (0.0906)	0.186* (0.0959)	0.140 (0.110)	0.223 (0.187)
Behavioural Science & Life Science	0.173* (0.103)	0.111 (0.127)	0.272*** (0.0851)	0.183 (0.897)
Experience abroad				
None	Ref.	Ref.	Ref.	Ref.
Working	-0.108* (0.0657)	-0.145** (0.0695)	0.0626 (0.0943)	-0.152* (0.0897)
Schooling	-0.0346 (0.0471)	-0.0353 (0.0491)	-0.0113 (0.110)	-0.0150 (0.0584)
Other	-0.0513 (0.0621)	-0.0668 (0.0636)	0.140 (0.110)	-0.104 (0.0745)
Continue studying	0.165*** (0.0386)	0.186*** (0.0404)	0.0636 (0.0758)	0.238*** (0.0472)
Hard locational factors				
View on career opportunities	0.0887** (0.0352)	0.0965*** (0.0366)	-0.196** (0.0961)	0.133*** (0.0409)
View on transport system	-0.0200 (0.0361)	-0.0193 (0.0378)	-0.123 (0.0888)	-0.0328 (0.0459)
Language proficiency important	0.0610 (0.0375)	0.0719* (0.0387)	0.102 (0.0975)	0.0811* (0.0458)
Fluent in English	-0.00748 (0.0390)	0.0150 (0.0403)	-0.119** (0.0547)	0.0125 (0.0505)
Soft locational factors				
Quality of life important	-0.130** (0.0510)	-0.104** (0.0523)	-0.0128 (0.0984)	-0.134** (0.0608)
View on the quality of life in the EMR	0.153*** (0.0542)	0.150** (0.0584)	0.336** (0.135)	0.171** (0.0777)
View on the openness in the EMR	0.150*** (0.0445)	0.180*** (0.0467)	0.142 (0.0886)	0.198*** (0.0655)
Social factors				
Distance to partner				
Living together	Ref.	Ref.	Ref.	Ref.
Same city/region	-0.0113 (0.0500)	-0.0103 (0.0538)	0.0258 (0.0706)	-0.0319 (0.0668)
Same/ other country	-0.311*** (0.0555)	-0.327*** (0.0566)	-0.738*** (0.0486)	-0.241*** (0.0639)

No partner	-0.129*** (0.0471)	-0.117** (0.0484)	-0.188** (0.0824)	-0.0655 (0.0577)
Social ties important	0.120*** (0.0388)	0.133*** (0.0406)	0.185* (0.109)	0.165*** (0.0478)
<i>N</i>	582	514	138	375
Marginal effects are presented, standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

We find that several variables lose significance. For example, for South Limburg, age loses its significance and for the region of Aachen, not having moved for studies loses significance, whereas these variables are highly significant for the EMR. However, in most cases the direction of the marginal effect points towards the same direction. There are two statistically significant different results. For South Limburg, those studying in the field of engineering, manufacturing and construction are less likely to have the intention to stay in the region, relative to students in the social sciences. We do not find significance for the other regions and the effects furthermore point towards the other direction. Last, for South Limburg, students who have a positive view on the career opportunities in the study region are less likely to stay, whereas we find opposite significant results for the other regions. Note that 12.05% is non-Dutch and studying in South Limburg in our study population, comparing those with the intention to leave and those with the intention to stay in the study region. The result indicates that prospective students are looking for more than an attractive work environment.

Table A3.2 Logit models comparing (im)mobility intentions of leavers and uncertain for each EMR sub-region

	EMR	EMR excluding BE	South Limburg	Aachen region
<i>Individual characteristics</i>				
Female	-0.0318 (0.0396)	-0.0565 (0.0408)	-0.167* (0.0910)	-0.0471 (0.0449)
Age	0.0176** (0.00837)	0.0133 (0.00866)	-0.00933 (0.0222)	0.0157 (0.00984)
Born in the EMR	0.0643 (0.0515)	0.0600 (0.0542)	0.0413 (0.112)	0.0711 (0.0619)
Not moved for study	0.0260 (0.0609)	0.0632 (0.0654)	0.202* (0.121)	0.0254 (0.0820)
Previous migration	-0.00173 (0.0152)	-0.00326 (0.0153)	-0.0185 (0.0322)	-0.00360 (0.0173)
<i>Institution</i>				
University	Ref.	Ref.	Ref.	Ref.
University of applied sciences	0.0622	0.0617	-0.127	0.0855

	(0.0539)	(0.0551)	(0.144)	(0.0634)
Degree				
Bachelor's	Ref.	Ref.	Ref.	Ref.
Master's	0.0930*	0.121**	-0.00267	0.136**
	(0.0492)	(0.0510)	(0.146)	(0.0560)
PhD	0.0905	0.120		0.152
	(0.0964)	(0.0970)		(0.104)
Top 25% students	-0.0659	-0.0940**	-0.0588	-0.105**
	(0.0431)	(0.0445)	(0.0976)	(0.0496)
Job as stepping stone towards future career	-0.000459	-0.00658	0.0628	-0.0192
	(0.0407)	(0.0409)	(0.112)	(0.0445)
Field of studies				
Social Sciences	Ref.	Ref.	Ref.	Ref.
Business & Economics	0.0774	0.0801	0.151	0.0684
	(0.0866)	(0.0924)	(0.149)	(0.130)
Law	0.0312	0.165	0.0829	
	(0.121)	(0.126)	(0.176)	
Science, Maths & Computing	0.0211	0.0429		0.0384
	(0.0812)	(0.0852)		(0.112)
Engineering, Manufacturing & Construction	-0.0431	-0.0322	-0.131	-0.0320
	(0.0759)	(0.0803)	(0.178)	(0.109)
Health & Welfare	0.0250	0.0208	0.0986	0.207
	(0.115)	(0.123)	(0.165)	(0.164)
Behavioural Science & Life Science	0.145	0.218**	0.225	0.192
	(0.103)	(0.105)	(0.139)	(0.219)
Experience abroad				
None	Ref.	Ref.	Ref.	Ref.
Working	-0.0207	-0.0110	-0.0953	0.0164
	(0.0612)	(0.0614)	(0.162)	(0.0682)
Schooling	-0.0817*	-0.0696	0.0944	-0.0953*
	(0.0493)	(0.0507)	(0.121)	(0.0569)
Other	-0.0309	-0.0133	0.296**	-0.0989
	(0.0604)	(0.0604)	(0.116)	(0.0693)
Continue studying	0.112**	0.108**	-0.0535	0.153***
	(0.0433)	(0.0446)	(0.108)	(0.0494)
Hard locational factors				
View on career opportunities	0.0690*	0.0740*	-0.0266	0.0860**
	(0.0389)	(0.0399)	(0.105)	(0.0432)
View on transport system	-0.0279	-0.0308	-0.0343	-0.0337
	(0.0385)	(0.0397)	(0.0862)	(0.0443)
Language proficiency important	-0.0133	0.00205	-0.0747	0.0353

	(0.0373)	(0.0380)	(0.0876)	(0.0420)
Fluent in English	0.00997	0.0210	0.132	0.0234
	(0.0453)	(0.0461)	(0.114)	(0.0507)
<i>Soft locational factors</i>				
Quality of life important	-0.110*	-0.0824	-0.0477	-0.0559
	(0.0598)	(0.0604)	(0.121)	(0.0674)
View on the quality of life in the EMR	0.160***	0.156***	0.00235	0.166***
	(0.0494)	(0.0507)	(0.135)	(0.0548)
View on the openness in the EMR	0.122***	0.129***	0.356***	0.0831
	(0.0459)	(0.0466)	(0.0967)	(0.0534)
<i>Social factors</i>				
Distance to partner				
Living together	Ref.	Ref.	Ref.	Ref.
Same city/region	0.0452	0.0634	-0.0120	0.0737
	(0.0575)	(0.0581)	(0.132)	(0.0628)
Same/ other country	-0.139**	-0.131**	-0.288**	-0.106
	(0.0576)	(0.0585)	(0.117)	(0.0655)
No partner	0.104**	0.111**	-0.111	0.141**
	(0.0503)	(0.0509)	(0.110)	(0.0560)
Social ties important	0.145***	0.140***	0.0790	0.150***
	(0.0383)	(0.0390)	(0.104)	(0.0427)
<i>N</i>	681	639	114	522
Marginal effects are presented, standard errors in parentheses				
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$				

The results are relatively similar between all the regions. We do find several differences in significant levels between the regions. For example, being a female significantly increases the likelihood to leave South Limburg. Furthermore, those living in South Limburg and not moved for their studies are more likely to be uncertain. However, these results are significant at 10%. Even though several differences in significant levels, most of the effects point towards the same direction. We find one significant exception. Prospective graduates in South Limburg with experience abroad are significantly more likely to be uncertain. The effect of the other regions point towards the opposite direction, yet is not significant. Overall, we conclude that there are hardly any differences between the regions. Hence, similar factors play a role in the migration intentions of prospective students.

4

Be prepared for the unexpected:

The gap between (im)mobility intentions and subsequent behaviour of recent higher education graduates

Hooijen, I., Meng, C., Reinold, J (2020). Be prepared for the unexpected: The gap between (im)mobility intentions and subsequent behaviour of recent higher education graduates. *Population Space and Place*, 26(5). doi:10.1002/psp.2313

This chapter is joint work with Julia Reinold and Christoph Meng. We thank RWTH Aachen, FH Aachen, University of Hasselt, Maastricht University, and Zuyd University of Applied Sciences for supporting the implementation of our survey by inviting their students to participate during the data collection in 2015. We extend our gratitude to everyone who participated in our follow-up survey in 2017 and to all interviewees who took the time to speak to us and share their personal stories. We are grateful to Melissa Siegel, Frank Cörvers, René Belderbos, Ineke Bijlsma, Raginee Baruah and Zoë Ogahara and four anonymous reviewers for their feedback and support. We are furthermore thankful to Antonina Levatino and Nicolai Netz for the constructive feedback and comments during the IMISCOE conference in Barcelona and the IMISCOE workshop in Hannover in 2018, to participants of the Migration Conference in Lisbon in 2018 and to Mark Levels, and Hildegard Schneider during the MACIMIDE conference in Maastricht in 2018. The Research Centre for Education and the Labour Market of Maastricht University financially supported the implementation of both surveys.

Abstract

Research on the relationship between mobility intentions and actual mobility behaviour is scarce. This study analyses the factors explaining the gap between (im)mobility intentions and behaviour of recent higher education graduates in the Euregio Meuse-Rhine, a cross-border region spanning the Netherlands, Belgium and Germany. The analysis is based on mixed methods, including survey data collected in 2015 and 2017 as well as semi-structured interviews to find out more about respondents' personal mobility trajectories and the extent to which their behaviour reflects their actual (im)mobility preferences. The findings indicate that location-specific capital impacts the probability to realise one's (im)mobility intention, as do other forms of capital, such as previous mobility experience and an internship during the study. Furthermore, personality traits and unexpected events, such as a change in relationship status, influence if respondents realise their initial (im)mobility intention.

Keywords: recent graduates, mobility intentions, mobility behaviour, skilled migration, mixed methods

JEL-codes: O18, R23

4.1 Introduction

Local economic development is strongly dependent on the transmission and accumulation of human capital. Higher education institutions play a significant role in delivering human capital to regions, which is why the settlement behaviour of prospective and recent graduates is increasingly deemed to be of central importance (Czaika, 2018; Van Riemsdijk & Wang, 2017; Abel and Deitz, 2012). Better understanding the drivers of graduate mobility is therefore receiving increased attention from both scholars and policymakers.

Over the years, it has been established that migration is a complex process that is subject to a set of interrelated factors including individual characteristics as well as economic, social, cultural and political factors (Kley, 2017; Kley & Mulder, 2010; Kan, 1999), and more recently also psychological factors (Jokela, 2014). This also applies to graduate mobility (Hooijen, Meng, Reinold & Siegel, 2017; Abreu, Koster & Venhorst, 2014). Often the act of moving is linked to major life-course events, such as starting tertiary education, a new job, or a family. Research initially either focused on the determinants of mobility intentions (i.e. stated preferences), which are measured prospectively, or the determinants of actual mobility behaviour (i.e. revealed preferences), which are measured retrospectively (Van Dalen & Henkens, 2008). However, it is questionable if individuals can actually act according to their preferences or to what extent their preferences change, which is why scholars are more and more interested in the relationship between mobility intentions and behaviour. Specifically, they are increasingly interested in finding out to what extent intentions predict behaviour and in explaining the gap between the two (Kley, 2017; Coulter & Scott, 2015; Kley & Mulder, 2010).

Research on the relationship between the mobility intentions of prospective higher education graduates and their actual mobility is scarce. To our knowledge, no previous studies have analysed the factors explaining the relationship between (prospective) graduates' (im)mobility intentions and their subsequent (im)mobility behaviour. This study aims at addressing this gap by answering the following research questions: 1) Which factors explain the gap between prospective graduates' (im)mobility intentions and actual (im)mobility behaviour? 2) To what extent do (im)mobility outcomes reveal recent graduates' preferences for (im)mobility? In answering these questions, this study can help predict future (im)mobility flows of recent graduates and is a first step towards informing policymakers on the retention of higher education graduates.

For the purpose of this study, higher education graduates are defined as individuals who completed tertiary education at a university or a universities of applied sciences,

including Bachelor's, Master's and PhD programmes. The concept of mobility⁴² accounts for a diverse range of mobility outcomes that could follow graduation, including moves over short and long distances, within and across countries, for various time spans and reasons. Furthermore, moving (i.e. mobility) and not moving (i.e. immobility) are seen as equivalent options in this study. To account for both at the same time, we choose to use the term (im)mobility throughout this paper, thereby contributing to moving away from the so-called 'mobility bias' in migration research, which regards immobility as the norm and mobility as an exceptional phenomenon requiring explanation (Carling & Schewel, 2018). Moreover, we apply the concept of 'intentions' to refer to concrete prospects of (im)mobility, which has been found to be a good predictor of behaviour (Carling, 2019).

The analysis is based on micro-level panel survey data from 2015 (wave 1) and 2017 (wave 2) that includes the (im)mobility intentions of prospective graduates from five higher education institutions in the Euregio Meuse-Rhine (EMR)⁴³ and their subsequent (im)mobility behaviour. It is combined with 27 qualitative semi-structured interviews to find out more about respondents' personal mobility trajectories. To our knowledge, this study is among the first to use a mixed methods approach to examine the relationship between (im)mobility intentions and behaviour. Furthermore, we apply a multidisciplinary approach, which few studies have employed so far (Jokela, 2014).

In line with previous studies, we find that location-specific capital such as attachment to the region, proxied by already being familiar with the study region,

42 In migration studies, the distinction between and the use of the concepts of migration and mobility receive increasing attention (King et al, 2016). Mobility is a broader concept, encompassing different movements including various forms of migration (Aybek, Huinink & Muttarak, 2015). The concept migration often refers to long-distance and long-term moves of at least one year (King and Raghuram, 2013; King & Findley, 2012). Accordingly, migration is one form of mobility, but not all forms of mobility can be regarded as migration (e.g. business trips, commuting, tourism). In a policy context, the term mobility is perceived as more neutral, which is why it is often used to refer to movements within the European Union (King et al, 2016). Although we prefer the term (im)mobility, we recognize that the terms mobility and migration are often blurred and difficult to disentangle because authors use them differently throughout the literature and because of the emergence of complex forms of mobility and migration (King et al, 2016). Therefore, the term migration is also used at times in this paper, especially when reviewing the existing literature.

43 The EMR is a cross-border region spanning parts of the Netherlands, Belgium and Germany (Hooijen et al., 2017). The EMR is especially interesting to study because it hosts five excellent research universities and several universities of applied sciences with more than 100,000 students from all over the world translating into an enormous potential of human capital (Hoogenboom & Reinold, 2017).

impacts the probability to realise one's (im)mobility intention, as do other resources, such as previous mobility experience and an internship during studying. Unexpected events, such as a change in relationship status, furthermore impact the likelihood of realising the initial (im)mobility intention. The interviews confirm these findings and highlight the importance of employment opportunities and (changes in) relationships in explaining the gap between (im)mobility intentions and behaviour. Furthermore, they show that recent graduates in most cases voluntarily change their (im)mobility intentions because of a combination of factors like unexpected job offers and relationship transitions. Sometimes interviewees postponed the realisation of their intention and very rarely failed to realise their intention.

The remainder of this chapter is structured as follows. First, in section 4.2, we review the existing literature on the relationship between (im)mobility intentions and actual behaviour, develop a conceptual framework and formulate research hypotheses. Second, we introduce our data and methodology in section 4.3. Third, we present the results of the quantitative analysis, and link them to the key findings of our interviews in section 4.4. Finally, in section 5.2, we conclude and formulate recommendations for future research.

4.2 (Im)mobility intentions and subsequent behaviour: theoretical background and previous findings

The relationship between mobility intentions and actual behaviour at the individual and household level has already received some attention from scholars from different academic disciplines including economics, demography, sociology and psychology (Clark & Lisowski, 2018; Dommermuth & Klüsener, 2018; Coulter & Scott, 2015; Coulter, 2013; De Groot et al., 2011; Kley & Mulder, 2010; Lu, 1999; De Jong et al., 1986), and multidisciplinary approaches (Van Dalen & Henkens, 2008; Jokela, 2014). As a result, migration decision-making has come to be seen as a complex process consisting of various stages rather than a one-off event. Scholars commonly distinguish between two-stage models (see for example Carling's (2002) aspiration/ability framework) and multi-stage models (distinguishing for example between a considering, a planning and a realising migration phase (Kley, 2011; 2017)). This shows that in both theoretical and empirical work on migration decision-making, different concepts referring to the prospects of migration (e.g. migration aspirations, considerations, plans) are being used. These concepts are sometimes used interchangeably, but should not be conflated since they have different meanings (Carling, 2019; Carling & Schewel, 2018). This is important to keep in mind when reviewing and comparing the existing literature on the relationship between migration intentions and behaviour, since the extent to which intentions or related concepts are realised is likely to depend on how they were measured. Migration considerations,

for example, are defined as thinking of migration “as a potential course of action for oneself” (Carling, 2019, p. 9) and can easily be abandoned again without any consequences (Kley, 2017). Migration intentions or plans, in contrast, are more concrete and more significant indicators for future mobility (Carling, 2019).

Much of the existing research draws on the theory of planned behaviour (Dommermuth & Klüsener, 2019; Coulter, van Ham and Feijten, 2011), its forerunner the theory of reasoned action (De Jong et al, 1986) or a combination of both (Kley, 2017; Van Dalen & Henkens, 2013). The theory of reasoned action assumes that behaviour is preceded by intention and therefore intentions predict behaviour, when measured in an appropriate way (Ajzen & Fishbein, 1980). Indeed, this assumption holds for most of the literature on the micro-level relationship between migration intentions (or related concepts) and behaviour: migration intentions are generally found to be a ‘good’ predictor of migration behaviour (Clark & Lisowski, 2018; Dommermuth & Klüsener, 2019; Hoppe & Fujishiro, 2015; Van Dalen & Henkens, 2013; Van Dalen & Henkens, 2008; De Jong, 2000; De Jong et al., 1986) including for young people (Kley & Mulder, 2010).⁴⁴ However, migration intentions do not predict subsequent behaviour perfectly, as a share of individuals who intend to move ‘fail’ to realise these intentions (Kley, 2017; Coulter & Scott, 2013; De Groot et al, 2011; Lu, 1999). Studying younger peoples’ (mean age 32) migration from Spain to Germany, Hoppe and Fujishiro (2015) find that they are more likely to realise their migration intentions since they are less settled and more open to migration, especially when transitioning from higher education to employment. On the contrary, Dommermuth and Klüsener (2019) conclude that younger adults (aged 18 to 24) in Norway change moving intentions more frequently due to a higher level of uncertainty at this life stage compared to later life stages.

Resources, opportunities and unexpected events

The theory of planned behaviour extends the theory of reasoned action by including the concept of ‘perceived behavioural control’, which implies that individuals are more likely to realise their intentions if they perceive their resources and opportunities to migrate as sufficient (Ajzen, 1991). Hence, intentions in combination with perceived behavioural control are assumed to predict behaviour. This notion is in accordance with theoretical frameworks that incorporate aspirations or capabilities of individuals

⁴⁴ Not all authors report the share of respondents who actually realised migration intention. Van Dalen & Henkens (2008, 2013) find that 24 and 34 percent respectively realised their intentions. Hoppe and Fujishiro (2015) distinguish between different decision-making phases. The extent to which individuals realise migration expectations varies from stage to stage, ranging from 2 percent in the ‘pre-decisional stage’, over 22 percent in the ‘pre-actional’ stage to 47 percent in the ‘actional’ phase.

into migration decision-making. These frameworks understand migration as a process during which individuals first develop migration aspirations, which are realised depending on their abilities or capabilities (De Haas, 2011; Carling, 2002). Hence, the realisation of migration intentions is assumed to depend on resources such as financial, social, human and location-specific capital, for instance regional familiarity (Coulter, 2013; Kley & Mulder, 2010; Fuller, 1986; Landale & Guest, 1985). Becoming more settled in a region through the accumulation of different forms of capital⁴⁵ is associated with individuals' inability to realise their mobility intentions (Lu, 1999; Landale & Guest, 1985). Kley and Mulder (2010) analysed what determines the realisation of young German adults' (aged 18-29) migration considerations and plans and concluded that they are more likely to realise these if they have their own income, if they do not live with their parents, if they have friends who migrated and if they have previous migration experience. Previous migration experience is also regarded as a form of capital as it may reduce the costs of moving again (Kley & Mulder, 2010). In addition, opportunities such as a concrete job offer or access to housing are decisive for individuals to be able to realise their mobility desires (Coulter & Scott, 2014), while a lack of opportunities may lead individuals to abandon or postpone mobility.

According to the theory of planned behaviour, intentions may not be realised if certain unexpected events affect intentions or perceived behavioural control (Ajzen, 1991), which is confirmed by research on migration intentions (or related concepts) and behaviour (Coulter & Scott, 2014; De Groot et al, 2011; Kan, 1999; De Jong et al., 1986; Gardner et al., 1985). Having analysed the mobility intentions and behaviour of adults based on longitudinal household data from the United States, Clark & Lisowski (2018) stress that, disregarding age, for many moving is indeed a process that is preceded by the formation of intentions, while for many others moving can become necessary or unavoidable under certain circumstances. This can go two ways: either individuals who initially intended to migrate do not move, or those who did not intend to migrate do move. This includes those who are involuntarily (im)mobile (see Carling, 2002). Socioeconomic changes, for example with regard to employment, are important life-course events that are frequently cited to alter migration intentions or to prevent people from realising their intentions (Coulter & Scott, 2014; De Groot et al., 2011; Kan, 1999; Gardner et al., 1985). When and where recent higher education graduates will find employment is not always predictable before graduation. Being familiar with the region where one studies can increase the access to relevant information on job opportunities and has been found to influence recent graduates' mobility (Venhorst, 2013).

⁴⁵ An example for this is home ownership, which does not seem relevant in the context of recent graduates' mobility decisions. In Germany, for example, home ownership is related to the number of years spent in paid employment (Mulder & Wagner, 1998) and recent graduates are at very early stages of their careers.

Hence, we expect individuals with more resources and opportunities to be more likely to realise their intention to stay or leave. Specifically, we expect respondents with more regional familiarity to realise their intention to stay and respondents with increased previous mobility experience to be more likely to realise their intention to leave (H1).

In addition, migration decisions are not always made in isolation from others. Mincer (1978) introduced the concept of the ‘tied mover’, which implies that individuals’ migration decisions need to be aligned with the wishes of the partner. Migration occurs if the net gain of migration for both partners is positive, even though one partner, the so-called ‘tied mover’, gains comparatively less from moving (ibid.). This is comparable to the ‘principle of linked lives’ used in life-course approaches, which stresses the importance of significant others in shaping individuals’ lives (Glen & Elder, 1994). Therefore, the role of the partner is potentially important in explaining the gap between mobility intentions and behaviour. In line with this, Coulter et al. (2012) find that moving desires of Britons are most likely to be realised if both partners share the desire to move with women being more likely not to realise their migration intentions if their partner disagrees. In addition, changes in the relationship status have been found to affect the realisation of mobility intentions, both for individuals intending to stay and individuals intending to leave in the case of the United States (Clark & Lisowski, 2018).

Therefore, we hypothesise that unexpected life-course events, such as a change in relationship status, can explain why recent higher education graduates do not realise their initial (im)mobility intention (H2).

Personality traits

Some scholars have devoted attention to the role of psychology in studying the relationship between migration intentions and behaviour. Psychological characteristics do not only predict mobility intentions (Fouarge, Özer & Seegers, 2019; Canache, Hayes, Mondak & Wals, 2013; Jokela, 2009),⁴⁶ but furthermore help

⁴⁶ For prospective graduates from universities in Germany, Fouarge et al. (2019) find that the Big Five personality traits extraversion and openness to experience are positively associated with individuals’ intention to migrate to culturally remote countries. Furthermore, they find a negative association between agreeableness, conscientiousness, and emotional stability (versus neuroticism) on migration intentions. Furthermore, Canache et al. (2013) find that openness to experience and extraversion are associated with the intention to emigrate in 22 countries in the Americas. In addition, Jokela (2009) finds that higher openness to experience and lower agreeableness predict the probability of migrating within and between U.S. states. High extraversion predicts the probability of migrating only within U.S. states.

explain the realisation of mobility intentions (Jokela, 2014; Van Dalen & Henkens, 2013). Van Dalen and Henkens (2013) find that the personality traits sensation-seeking (i.e. risk-loving) and self-efficacy (i.e. being in control) positively influence emigration intentions among native-born Dutch residents. However, they find no significant evidence for these variables in explaining the realisation of emigration intentions. Jokela (2014) focused on the role of the Big Five personality traits in realising migration desires in British households. The results indicate that people scoring high on the Big Five personality trait conscientiousness are more likely to act according to their desires. This is in line with the research literature that assumes that people scoring high on this personality trait are reliable, organised, responsible and 'planful' (Jokela, 2014; Ashton, 2007; McCrae & John, 1992). Jokela (2014) furthermore finds that people scoring high on the personality trait neuroticism are less likely to realise their migration desires. This implies that respondents without a desire to move are more likely to actually move and those who do desire to move are less likely to do so. The study, however, does not explain the mechanism behind this phenomenon. Neuroticism is associated with worrying excessively and being more sensitive to negative emotions and feelings. Neurotic individuals are therefore more prone to experiencing fear and anxiety (Ashton, 2007; McCrae & John, 1992), which is why they might be quicker in expressing moving desires based on their current emotional state (Jokela, 2014), without acting in line with these. The same fear could furthermore prevent one from realising mobility intentions.

Therefore, we expect higher scorers on conscientiousness to be more likely to realise (im)mobility intentions (H3) and higher scorers on neuroticism to be less likely to realise their (im)mobility intentions (H4).

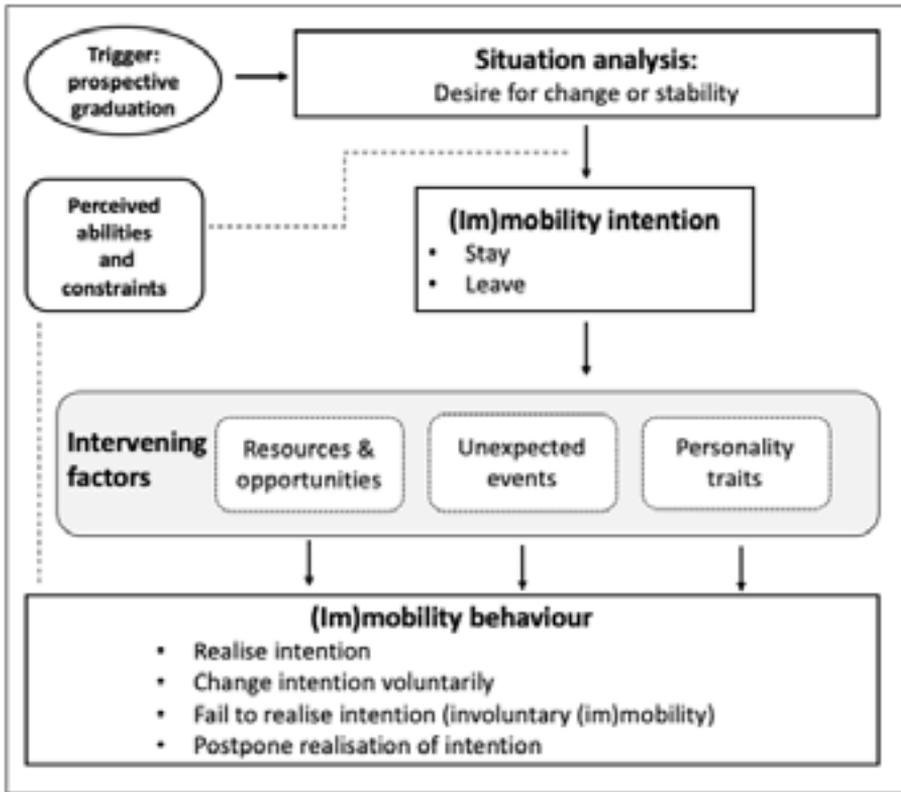
To our knowledge, no previous study has analysed the relationship between prospective graduates' (im)mobility intentions and their actual (im)mobility behaviour after completing higher education. Looking at this group separately is especially interesting for various reasons. First, recent graduates have several characteristics in common. They are at a similar (young) age which makes them less likely to be settled since they are less likely to be married, have children or own a house. In addition, they are highly educated, which translates into more opportunities and resources, as well as improved career prospects. All of them are anticipating a major life event, the transition from higher education to employment, which is likely to trigger mobility. In the context of today's ongoing competition for talent, higher education graduates are often regarded as ideal individuals to retain (Czaika, 2018; Van Riemsdijk & Wang, 2017). Better understanding the (im)mobility behaviour of recent graduates and how it relates to previously formed intentions despite these similar characteristics can help predict future migration flows and inform policies on the retention of higher education graduates.

In addition, existing research commonly focuses on moving intentions and disregards the option of staying as a valid alternative to moving (Schewel, 2019; Carling, 2019; Carling & Schewel, 2018). By analysing (im)mobility intentions and behaviour, we contribute to moving away from this so-called ‘mobility bias’, which considers immobility as the norm and mobility as “an aberration, demanding explanation” (Carling & Schewel, 2018, p. 954). Both mobility and immobility should be treated as “equivalent options” (Carling, 2019, p. 17) in the decision-making process, even though they might be motivated by different factors (Schewel, 2019; Carling & Schewel, 2018; Mata-Codesal, 2015).

Conceptual framework

Based on the reviewed literature, we developed the conceptual framework depicted in Figure 4.1 to explain the hypothesised relationship between (im)mobility intentions and behaviour of recent higher education graduates. The framework acknowledges that the migration decision-making is a process consisting of various stages. In a first step, the prospect of graduation from university triggers students to think about their future (im)mobility. Based on an analysis of their current situation and their available options, they form (im)mobility intentions. Both staying in the study region (immobility) and leaving the study region (mobility) are regarded as equivalent alternatives, which deserve further analysis (Carling, 2019). The formation of (im)mobility intentions is influenced by students’ perceived abilities and constraints to realise respective intentions (also referred to as ‘perceived behavioural control’, ‘self-efficacy’ or ‘capability’ in the literature). If (im)mobility is not feasible at all, respective intentions will not be formed.

Figure 4.1 Conceptual framework relationship between (im)mobility intentions and behaviour



The focus of this chapter is on the second step, namely the relationship between (im)mobility intentions that were already formed and subsequent (im)mobility behaviour. While important to mention for a more comprehensive overview of the decision-making process, analysing the factors influencing the first stage, the formation of intentions (see chapter 3), is beyond the scope of this chapter. Based on the literature review, we identify three groups of intervening factors linking (im)mobility intentions and behaviour, namely resources and opportunities, unexpected events and the Big Five personality traits. Examples for resources and opportunities in the context of graduate (im)mobility are educational level, previous mobility, work experience and regional familiarity. Unexpected events can be both positive and negative (i.e. “disruptive”) (Clark, 2016). Examples are relationship break-ups, finding a new partner, unexpected job offers or not being able to find a job in the preferred

destination.⁴⁷ Perceived abilities and constraints and changes in these perceptions also have an influence on the implementation of (im)mobility intentions.

The intervening factors explaining the relationship between (im)mobility intentions and behaviour are analysed based on survey and interview data. These factors can facilitate or constrain the realisation of (im)mobility intentions, leading to 1) the realisation of intentions, 2) a voluntary change in intentions, 3) a failure to realise intentions (which can lead to involuntary (im)mobility), and 4) a postponement of the realisation of intentions.

While existing research based on quantitative data mostly looks at whether or not individuals moved and how this compares to their previously indicated intentions, we argue that it is important to disentangle the (im)mobility outcomes in more detail. If individuals do not act according to their intentions, it is often described as a failure or inability to realise intentions, which is not necessarily the case and does not reflect the internal decision-making process sufficiently. At the same time, referring to (im)mobility behaviour as ‘revealed preferences’ may be problematic as individuals are not always able to act according to their preferences. Based on semi-structured interviews with individuals who participated in the survey, we aim to arrive at a more nuanced understanding of the (im)mobility outcomes and how they relate to individuals’ actual preferences.

4.3 Data and methodology

Mixed Methods Design

This chapter applies a mixed methods approach using both micro-level survey data and semi-structured interviews. Combining qualitative and quantitative research methods can have several advantages as it arguably produces “more complete knowledge” (Johnson & Onwuegbuzie, 2004, p.21). Using a combination of methods can contribute to overcoming weaknesses of one single method and therefore lead to more meaningful conclusions (Creswell & Plano Clark, 2011; Johnson & Onwuegbuzie, 2004). This is especially relevant for the topic under investigation in this study. As argued by Van Dalen and Henkens (2008) it is “necessary to add information on circumstances and expectations between the time of measuring intentions and the time when actual behaviour is measured” (p.20). Combining qualitative and quantitative data adds to a more nuanced understanding of the gap

⁴⁷ Our analysis does not cover more anticipated events like childbirth or buying a house, which are life-course events that are more likely to happen after having spent a few years in paid employment and not directly after graduation from higher education (Mulder & Wagner, 1998).

between (im)mobility intentions and behaviour through disentangling if individuals do not realise their intentions because of failing to realise, postponing or voluntarily changing them. Furthermore, it gives insights into the underlying reasons and motivations leading up to this. Existing literature on the relationship between migration intentions and behaviour is, however, mostly based on quantitative methods. By using mixed methods, this study therefore also contributes to the field of research methodologically.

The purpose of combining qualitative and quantitative methods in this chapter is twofold, namely triangulation and complementarity (Schoonenboom & Johnson, 2017; Greene et al, 1989). First, both the survey and interview data aim to answer the first research question on the intervening factors explaining the gap between (im)mobility intentions and behaviour, to see if they yield the same results (i.e. triangulation). In addition, the interviews can help us arrive at a more nuanced understanding of recent graduates' (im)mobility trajectories through disentangling if interviewees were able to act according to their (im)mobility preferences. Hence, they yield complementary information on the process underlying the quantitative outcomes. In doing so, they enhance the quantitative findings as well as provide context and illustrations to them (Schoonenboom & Johnson, 2017; Bryman, 2006).

Regarding the timing of research activities, the study follows a sequential-independent design, meaning that the survey and the interview data were collected sequentially (i.e. survey was implemented before interviews were conducted) and the analyses of both data sources were conducted independent of each other. Hence, the qualitative analysis does not depend on the quantitative analysis or vice versa. Data sources were integrated at two points, namely for the sampling of interviewees and when discussing the results. The study is thus in line with Creswell and Plano Clark's (2011) typology of a convergent parallel design (i.e. independent analysis, integration of findings in results section). The study is guided by a realist epistemological approach, which allows us to interpret the data in a straightforward way because it is assumed that experiences are adequately reflected by respondents' language (Braun & Clark, 2006).

Surveys

The quantitative analysis is based on micro-level survey data of (prospective) higher education graduates of different disciplines from five higher education institutions (Maastricht University, Zuyd University of Applied Sciences, RWTH Aachen, FH Aachen and University of Hasselt) in the EMR. The data collection was carried out by Maastricht University in cooperation with several faculties from the respective institutions at two points in time – from June to October in 2015 (see data used

in chapter 3) and from September to October in 2017.⁴⁸ In 2015, students were approached through their student email accounts⁴⁹ and, if they indicated to be willing to participate in future research (57.4%), respondents were again approached via email in 2017 using the email addresses respondents had provided themselves in 2015. This allowed us to follow the same cohort and to learn more about the relationship between (im)mobility intentions (which was the focus of the 2015 survey) and actual (im)mobility behaviour after graduation (the focus of the 2017 survey). The probability that graduates leave the study region is the highest in the two years after graduation and decreases with every additional year (for German NUTS3 see Teichert, Niebuhr, Otto & Rossen, 2018; for Finnish NUTS3 see Haapanen & Tervo, 2012 and for German NUTS1 see Busch & Weigert, 2010). We therefore leave approximately two years between the implementation of the first and second survey. This furthermore increases the chances for respondents to have finished their studies and to have had the possibility to move. Not all mobility takes place immediately after finishing education, however, and we may therefore not be able to fully capture all mobility flows in this study.

The response rate for the data collected in 2017 is 14.0 percent (N=220) compared to the whole sample in 2015 (N=1570). The response rate is computed excluding those who had an uncertain (im)mobility intention (45.4%) in 2015 because we are only interested in those who had a clear intention.⁵⁰ We furthermore exclude those who commuted to university from outside the study region (13.7%) in 2015 to compare groups with a similar geographical starting point. Last, we exclude students who were at the beginning of their Bachelor's (9.9%) in 2015 to limit the possibility that respondents have not finished⁵¹ the degree they were pursuing back in 2015.

⁴⁸ See page 84 in chapter 3 for possible shortcoming in the sampling method.

⁴⁹ The first wave targeted students in the final phase of their studies since it was assumed that this group had already thought about their future (im)mobility. Unfortunately, it was not possible for all participating institutions to single out this group when sending the invitations, which is why the survey included a question on the phase of the studies (beginning, middle or end) to be able to identify the target group.

⁵⁰ 229 respondents in the follow-up survey indicate to have an uncertain mobility intention in the first wave of data collection. The results of the second wave show that 41 percent left and 59 percent stayed in the study region. We consider this to be a relatively equal distribution. It is beyond the scope of this paper to discuss the ones with an uncertain intention further in depth as our focus is on the realisation of mobility intentions.

⁵¹ All students who were following a Bachelor's degree in wave 1 finished their education at the time of wave 2. Furthermore, the majority (81.89%) of Master's students of wave 1 finished their education. The Master's students of wave 1 that did not complete their degree (18.10%) in wave 2 (N=21), 15 respondents (71.43%) are currently still studying and six (28.57%) respondents are currently doing something else than studying or working. Five respondents are doing an

Therefore, we can assume that our respondents experienced a transition (e.g. to the labour market or another study programme) between the first and second wave of the survey, which implies that all of them had to make a decision of whether or not to move.

Quantitative data analysis

In our main model, we estimate probit regressions to better understand the relationship between the initial (im)mobility intention⁵² and actual behaviour. We run separate models for respondents with the intention to stay and those with the intention to leave the region after the completion of the degree they were studying for in 2015. The non-random sampling approach gives reason to suspect that the probit regression suffers from sample selection bias. This might be the case if the (im)mobility behaviour of respondents who participated in the 2017 survey is systematically different from those who did not participate in the follow-up (Baum, 2006). Since our dependent variable is binary, we opt for a binomial probit with a selection procedure to account for possible selection effects (Van de Ven & Praag, 1981). This procedure is divided into two stages. First, a selection model is specified estimating the likelihood of respondents to participate in the 2017 survey. Second, the binary dependent variable for realising one's (im)mobility intention conditional on having participated in the 2017 survey is estimated in the outcome models (Table 4.2). The results are compared to the results of the main model to better understand their validity. Both the probit model and the binomial probit with selection model (BPSM) include the same independent and control variables. In addition, the selection equation controls for the two variables that are excluded in the main model. These variables indicate whether someone received an invitation to participate in the 2017 survey via a university email address and if people wanted to participate in the raffle to win a prize in 2015.⁵³ These exclusion restrictions are assumed to influence the participation of individuals in the second wave, but do not influence the realisation of (im)mobility intentions. The rationale behind this is that respondents might not use their university email address any longer after graduation, which decreases the

internship or traineeship and one respondent is having a gap year. For PhDs, about 50 percent finished by the time of wave 2.

- 52 The mobility intention in 2015 was measured in two steps by the following questions:
- Do you intend to move to another town/city after your studies? (The response categories were (1) yes; (2) no; (3) don't know yet.)
 - Where do you plan to live? (The response categories were (1) stay in the Euregio Meuse-Rhine, (2) Leave the Euregio Meuse-Rhine, (3) Don't know yet).
- 53 Participants could indicate if they wanted to enter a raffle to win a price upon completion of the survey.

chances of participation in the 2017 survey and is likely to bias in favour of stayers. Moreover, we assume that respondents who wanted to participate in the raffle shared their contact details to support further research more easily. As expected, we find significant positive signs for the prize variable for both stayers and leavers, while the email variable was only positive and significant for the stayers. The results of the selection stage can be found in Appendix A4.2.

Dependent variable

The dependent variable investigated in this study has two possible outcomes, indicating if respondents realised their (im)mobility intention as expressed in 2015 by 2017. In 2017, respondents were asked to indicate what situation applied best to them: (1) having left the study region (leavers), (2) not having left the study region (stayers), or (3) having left and returned again (returners). Stayers and returners are grouped together because the group of returners comprises less than 5 percent of the sample.⁵⁴ Information on residency in 2017 is compared to the intentions expressed in 2015 to establish if intentions were realised or not.⁵⁵

Independent variables and control variables

To test our hypotheses, we include a set of independent variables, which are expected to explain the gap between (im)mobility intentions and behaviour. As proxies for *resources and opportunities*, which could have an influence on whether or not respondents realise their (im)mobility intentions, we include previous mobility experience, regional familiarity (indicating if respondents were born in the EMR, lived in the EMR at age 16 and lived in the EMR in 2015), having done an internship inside or outside the study region, and educational level (degree one was pursuing in 2015) (all linked to *H1*). To account for *unexpected changes* (*H2*), we include changes in relationship status between 2015 and 2017 and if expectations for activities after graduation (i.e. continue studying, working, other) changed. Finally, we include self-reported Big Five *personality* traits (conscientiousness, extraversion, agreeableness, openness to experience and neuroticism) (*H3&4*), which are measured in 2015 using the 15-item Big Five Inventory (BFI) of personality dimensions which are assessed using a 7-point Likert-type scale (Ashton, 2007). Cronbach's alpha is used to group the different items of the BFI.

⁵⁴ Excluding returners entirely does not change the models significantly.

⁵⁵ From the respondents who were living in the study region when aged 16, 82.3 percent are still living in the study region in wave 2. From the respondents who were living outside the study region when aged 16, 51.1 percent are still living in the study region (EMR) in wave 2.

In addition, we include a set of *control variables* including age, gender and the study field in 2015 distinguishing between soft (e.g. social sciences, health and welfare) and hard science, (e.g. mathematics, engineering) based on the ISCED-F 2013 classification.⁵⁶ Moreover, we account for the importance respondents attach to the quality of life and social ties when choosing their residency after graduation.⁵⁷ These variables are measured in 2015 and combined using factor analyses.⁵⁸

We test for multicollinearity among the explanatory variables used in our models. The regression coefficients are stable with a variance inflation factor value (VIF) of 1.3. The VIF measures the extent of correlation between one independent variable and the other independent variables in the model. A VIF between 4 and 10 or higher is a sign of multicollinearity (O'Brien 2007).

Interviews

The quantitative analysis is combined with 27 semi-structured qualitative interviews with survey respondents to better understand the gap between (im)mobility intentions and behaviour. The quantitative and qualitative analyses can both help us better understand the gap between (im)mobility intentions and behaviour by identifying the intervening factors (i.e. triangulation). In addition, interviews allow us to disentangle if intentions were not realised because 1) people changed their intentions, 2) failed to realise their intentions, or 3) if mobility was postponed (i.e. contextualisation).

Using a non-random purposive sampling technique (Patton, 1990), survey respondents who had not realised their (im)mobility intention and who had agreed on supporting further research in 2017 were invited for an interview via email. In

⁵⁶ We refer to hard science for those with a degree in Science, Mathematics & Computing or Engineering, Manufacturing, Construction (in total 65.60%). We group all other fields together and refer to it as soft science due to a relatively low sample size compared to the study fields in hard science. Specifically, we group the ones together with a degree in Social Sciences (8.72%), Business & Economics (6.42%), Law (8.72%), Health & Welfare (2.75%), and Behavioural Science or Life Science (7.80%) (in total 34.40%).

⁵⁷ Quality of life refers to the importance of the living environment, cultural and social activities, aesthetic appeal of the region, and way of life; social ties include the importance of family and friends in choosing the residency after graduation.

⁵⁸ We considered controlling for (1) the sub-region in which respondents were living in 2015 (2) nationality in relation to the place of the educational institution because these are assumed to be relevant indicators of future mobility. These variables, however, do not seem to add explanatory power to the model, as goodness of fit tests (both AIC and BIC), one-way analysis of variance (ANOVA) and chi-squared tests indicate excluding these variables. We assume that this can also be due to the small sample size.

total, 85 respondents were approached. With 27 conducted interviews, the response rate is 31.8 percent. Interviews were conducted between April and May 2018. Depending on time and distance constraints, they were conducted in person by the authors themselves, via Skype or telephone, or in writing. Interviews were conducted in English, German or Dutch. During the interviews, respondents were asked about their personal (im)mobility trajectory and the main determinants underlying their (im)mobility behaviour.

In total, we interviewed 13 people who intended to leave in 2015, but were still living in the region in 2017 and 14 people who intended to stay in 2015, but had left in 2017. The 27 interviewees are on average 26.4 years old (ranging from 22 to 33), 11 are female and 16 male.⁵⁹ The majority is German (N=10) followed by Dutch (N=7), and Belgian (N=4). In addition, two respondents come from other European countries⁶⁰ and four from non-European countries.⁶¹ We expected all interviewees to have graduated from the programme they were studying for when participating in the first wave of the survey in 2015 by the time of the interview.

Qualitative data analysis

Having conducted and transcribed the interviews ourselves, we were very familiar with the qualitative data already. For further data immersion, we repeatedly listened to recordings and re-read the transcripts. Using a deductive approach guided by the research questions, literature review, hypotheses and analytical framework, we went carefully through recordings and transcriptions to examine and organise the information. Data was coded manually in line with various principles (e.g. intention, behaviour, explanation, occupation, gender, age, origin) (Gläser & Laudel, 2013). This allowed us to identify common as well as exceptional experiences of interviewees. In doing so, we applied a realist perspective and a semantic approach “not looking beyond what a participant has said” (Braun & Clarke, 2006, p.84). Common categories are described in the results section together with illustrative quotes.

59 This slight imbalance is not surprising since the share of male survey respondents is a bit larger (53.7 %).

60 Spain and Poland.

61 China, India, Mexico and Syria.

4.4 Results

4.4.1 Descriptive Analysis

The descriptive statistics of the independent and control variables included in the regression analysis are presented in Table 4.1, disaggregated by (im)mobility intention and whether or not the intention was realised.

Table 4.1 Descriptive statistics of variables of interest

Descriptive statistics		Intention to stay		
		Not realised	Realised	Total
Resources and Opportunities				
Familiar with the region**		32.35%	55.95%	49.15%
Previous mobility, mean		3.55	2.69	2.94
Min-Max		1-9	1-7	1-9
SD		1.54	1.52	1.57
Degree one was pursuing in 2015				
	BA	29.41%	39.29%	36.44%
	MA	61.76%	48.81%	52.54%
	PhD	8.82%	11.90%	11.02%
Have you done an internship during your study?				
	Yes, in the study region	35.29%	30.95%	32.20%
	Yes, outside the study region	20.59%	29.76%	27.12%
	No internship	44.12%	39.29%	40.68%
Unexpected events				
Relationship status***				
	No change in the relationship status between wave 1 & wave 2	73.53%	94.05%	88.13%
	Broken heart	8.82%	2.38%	4.24%
	New love	17.65%	3.57%	7.63%
Change in expectations after graduation		52.94%	52.38%	52.54%
Personality (t0)				
Big Five – mean (scale 1 -7)				
	Conscientiousness**	5.00	5.32	5.23
	Extraversion	4.65	4.75	4.72
	Agreeableness	5.39	5.23	5.27
	Openness	4.87	4.57	4.65
	Neuroticism	3.76	4.14	4.03
Background variables				
Gender (female)		50.0%	50.0%	50.0%

Age, mean		26.35	26.71	26.61
Min-Max		21-33	22-43	21-43
SD		2.89	3.79	3.55
Study field (hard science)		61.76%	65.48%	64.41%
Professional status in 2017				
	Studying	26.47%	32.14%	30.51%
	Working	52.94%	51.19%	51.69%
	Other	20.59%	16.67%	17.80%
Importance of reasons of mobility behaviour indicated by respondents (t1)				
	Family and friends	55.88%	71.43%	66.95%
	Partner	64.71%	70.24%	68.64%
	Work**	88.24%	67.86%	73.73%
	Study	52.94%	41.67%	44.92%
	Adventure*	32.35%	17.86%	22.03%
	Living environment	58.82%	70.24%	66.95%
	Costs of living	58.82%	51.19%	53.95%
N				
		34	84	118
		28.81%	71.19%	100%

*** p<0.01, ** p<0.05, * p<0.1

Note: Chi2- tests were applied for binary variables, one-way analysis of variance (ANOVA) tests, and a subsequent Bartlett's tests for continuous variables. SD is standard deviation. Note that the last row with N denotes the sum.

Table 4.1 Descriptive statistics of variables of interest (continued)

Descriptive statistics	Intention to leave			
	Not realised	Realised	Total	
Resources and Opportunities				
Familiar with the region	18.92%	10.77%	13.73%	
Previous mobility, mean***	3.24	4.52	4.05	
Min-Max	1-7	1-21	1-21	
SD	1.58	2.92	2.59	
Degree one was pursuing in 2015				
	BA	51.35%	30.77%	38.24%
	MA	43.24%	58.46%	52.94%
	PhD	5.41%	10.77%	8.82%
Have you done an internship during your study?				
	Yes, in the study region	18.92%	12.31%	14.71%
	Yes, outside the study region	54.05%	55.38%	54.90%
	No internship	27.03%	32.31%	30.39%
Unexpected events				
Relationship status***				

	No change in the relationship status between wave 1 & wave 2	78.38%	67.69%	71.57%
	Broken heart	8.11%	9.23%	8.82%
	New love	13.51%	23.08%	19.61%
	Change in expectations after graduation	35.14%	50.77%	45.10%
Personality (t0)				
Big Five – mean (scale 1 -7)				
	Conscientiousness	5.22	4.99	5.07
	Extraversion	4.60	4.64	4.63
	Agreeableness	5.36	5.47	5.43
	Openness	4.84	4.73	4.77
	Neuroticism	4.05	3.89	3.95
Background variables				
	Gender (female)	40.54%	43.08%	42.16%
	Age (mean)	25.78	26.51	26.24
	Min-Max	22-34	22-35	22-35
	SD	2.68	2.62	2.65
Study field in 2015				
	Soft science	32.43%	32.31%	32.35%
	Hard science	67.57%	67.69%	67.65%
Professional status in 2017***				
	Studying	59.46%	21.54%	35.29%
	Working	24.32%	50.77%	41.18%
	Other	16.22%	27.69%	23.53%
Importance of reasons of mobility behaviour indicated by respondents (t1)				
	Family and friends	48.65%	63.08%	57.84%
	Partner*	43.24%	60.00%	53.92%
	Work**	59.46%	80.00%	72.55%
	Study	54.05%	49.43%	50.98%
	Adventure***	13.16%	50.77%	37.25%
	Living environment**	56.76%	76.92%	69.61%
	Costs of Living	40.54%	55.38%	50.00%
N				
		37	65	102
		36.27%	63.73%	100%

*** p<0.01, ** p<0.05, * p<0.1

Note: Chi2- tests were applied for binary variables, one-way analysis of variance (ANOVA) tests, and a subsequent Bartlett's tests for continuous variables. SD is standard deviation. Note that the last row with N denotes the sum.

Stayers

The first part of Table 4.1 refers to the 118 respondents with the intention to stay, of which 84 (71.2%) realised this intention. Half of all respondents with the intention to stay are female and on average 26.6 years old. 51.7 percent of intended stayers were working in 2017, 30.5 percent were studying and 17.8 percent reported other activities as their professional status. 71.4 percent of those who realised the intention to stay indicated that family and friends played an important part in their decision to stay, followed by the partner and the living environment (important for 70.2% each), and work (important for 67.9%). For those who intended to stay but left, 88.2 percent indicated work as an important reason for this. In this regard, they differ significantly from stayers who realised their intention. 64.7 percent of those who did not realise their intention to stay, reported that the partner played an important role in their decision to leave, followed by the costs of living and the living environment (58.8 % each). A significantly larger share of those who did not realise their intention to stay also indicated 'adventure' as a reason for moving. Other significant differences between the two groups relate to their familiarity with the region (56.0% vs 32.4% respectively) and changes in the relationship status. Of those who realised the intention to stay, 94.1 percent did not experience changes in their relationship status between 2015 and 2017, compared to 73.5 percent of those who did not realise the intention to stay. 8.8 percent of those who did not realise their intention to stay broke up with their partner and 17.7 percent found a new partner, compared to 2.4 percent and 3.6 percent of stayers respectively. Finally, there is a significant difference between those who realised their intention to stay and those who did not with regard to their score on conscientiousness, with stayers scoring slightly higher.

Leavers

The second part of Table 4.1 refers to the 102 respondents with the intention to leave, of which 65 (63.7%) realised this intention. 42.2 percent of those with the intention to leave are female and on average they are 26.2 years old. Respondents who did and did not realise their intention to leave differ significantly in terms of their professional status in 2017. A significantly larger share of those who had not realised their intention were studying (59.5% vs 21.5%). At the same time, significantly larger shares of leavers were working (50.8% vs. 24.3%) or pursuing other activities (27.7% vs 16.2%). Those who realised their intention to leave and those who did not differ significantly from each other regarding the main reasons for their (im) mobility. For both groups, the largest share of respondents indicated work to be an important reason for their behaviour. However, the share is much larger among those who realised their intention to leave (80.0% vs 59.5%). The living environment was indicated as an important reason by 76.9 percent of those who left and by 56.8

percent of those who stayed. Family and friends were reported to play an important role in the decision to leave for 63.1 percent compared to 48.7 percent of those who stayed. The share of respondents who indicated the partner to play an important role reaches 60.0 percent among leavers and 43.2 percent among stayers. Finally, 50.8 percent of those who realised their intention to leave reported adventure as a main reason, compared to 13.2 percent of those who did not realise their intention. Those who did not realise their intention to leave are on average more familiar with the region (19.9% vs 10.8%) and have less mobility experience (mean 3.2 vs 4.5 previous moves). Finally, the two groups differ significantly when it comes to changes in their relationship status between 2015 and 2017. Those who realised the intention to leave less frequently experienced changes in their relationship status (67.7% vs 78.4%), were separated (9.2% vs 8.6%) or found a new partner (23.1% vs 11.4%) more often.

4.4.2 Explaining the gap between (im)mobility intention and behaviour

Table 4.2 presents the results of the regressions to explain the gap between (im)mobility intention and subsequent behaviour. Model 1a and Model 1b present the probability to have realised the intention to stay and Model 2a and Model 2b present the probability to have realised the intention to leave. Model 1a and 2a are probit models and Model 1b and 2b BPSMs. The results are presented using average marginal effects (AMEs). The hypotheses will be tested based on the BPSM. Results of the probit models, including the coefficients of the control variables, and the full results of the BPSM, including the outcomes of the selection stage, can be found in Appendix A4.1.

Table 4.2 Probit model and BPSM of realising the intention to stay or leave

	Realising the intention to stay		Realising the intention to leave	
	Model 1a Probit	Model 1b BPSM	Model 2a Probit	Model 2b BPSM
Resources & opportunities				
Familiar with the region	0.221** (0.0998)	0.0873*** (0.0286)	0.00870 (0.134)	0.00843 (0.0263)
Previous mobility	-0.0469* (0.0282)	-0.0102 (0.00801)	0.0563* (0.0301)	0.0156** (0.00646)
Degree (Ref.: BA)				
MA	-0.227*** (0.0824)	-0.0901*** (0.0297)	0.0573 (0.103)	0.0125 (0.0248)
PhD	-0.0543 (0.143)	-0.0695 (0.0500)	0.132 (0.205)	-0.00252 (0.0574)

Internship during study (Ref.: Yes inside the study region)				
Yes, outside study region	0.0575 (0.0993)	0.00777 (0.0303)	0.260** (0.131)	0.0953** (0.0455)
No	-0.0495 (0.0907)	-0.0126 (0.0264)	0.294** (0.142)	0.105** (0.0494)
Unexpected events				
Relationship transition (Ref.: No change in relationship status between wave 1 & wave 2)				
Broken heart	-0.365* (0.206)	-0.114 (0.0883)	0.0516 (0.177)	0.0194 (0.0469)
New Love	-0.458*** (0.156)	-0.183** (0.0907)	0.142 (0.107)	0.0252 (0.0198)
No change in expectations after graduation	0.150* (0.0824)	0.0476* (0.0271)	-0.0739 (0.0981)	-0.0220 (0.0183)
Personality				
Conscientiousness	0.0839** (0.0420)	0.0176 (0.0146)	-0.107** (0.0464)	-0.0147 (0.0112)
Extraversion	0.0472 (0.0345)	0.00939 (0.0109)	0.0175 (0.0378)	0.0155 (0.00961)
Agreeableness	-0.00241 (0.0442)	0.00992 (0.0139)	0.0749 (0.0531)	0.00462 (0.0125)
Openness to experience	-0.00384 (0.0374)	-0.00466 (0.0120)	-0.0244 (0.0419)	-0.0110 (0.0104)
Neuroticism	0.0747** (0.0366)	0.0225* (0.0125)	-0.00646 (0.0379)	-0.00477 (0.00962)
<i>N</i>	118	118	102	102
Censored <i>N</i>		566		610
Wald $\chi^2(21)$		47.40		47.11
Prob > χ^2		0.0008		0.0009
Fisher's transformed correlation		-14.9206*** (4.8153)		-15.07927 (7.8042)
(Derived) correlation (Rho)		-1 (0.0000)		-1 (0.0000)
LR test (indep. Eqns.) ($\rho = 0$): $\chi^2(1)$		4.19**		4.65**

Note: AMEs are presented, standard errors in parentheses.

The dependent variable takes a value of 1 for having realised the (im)mobility intention.

Controlled for gender, age, study field; current status (working, studying, other), Quality of Life extremely important, Social ties extremely important.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Intervening factors: resources & opportunities, unexpected events and personality

The significance level of the Wald test and the likelihood-ratio (LR) test of independent equations rejects the null hypothesis with an estimated rho of (-1) between the two equations' errors, indicating that the probit models suffer from sample selection. Estimates explaining the gap between (im)mobility intention and behaviour without controlling for sample selection would therefore lead to biased results. The BPSM controls for this bias (model 2a and model 2b) (Baum, 2006; Van de Ven and Van Praag, 1981; Heckman, 1979). Unless reported otherwise, results of the BPSM (model 2a and model 2b) and the probit model (model 1a and model 1b) are consistent with respect to the sign of the effects and the significance of the effects. However, the difference in magnitude of the marginal effects between these models is relatively large.

Resources and opportunities

In model 1b, average marginal predictions indicate that the probability of having realised the intention to stay in the study region increases with 8.7 percentage points (pp) for the respondents who are familiar with the region. In model 1a, without controlling for selection bias, we find a larger marginal effect of 22.1 pp. In addition, in model 1a, previous mobility decreases the likelihood of having realised the intention to stay by 4.7 pp. However, this effect is only marginally significant and no significant effect is found in the selection model 1b. In the BPSM for realising the intention to leave (model 2b) previous mobility increases the probability by 1.6 pp for the respondents who realised the intention to leave. A similar effect is reported in model 2a with 5.6 pp.

On average, the probability of having realised the intention to stay in the study region decreases by 9.0 pp in the BPSM 1b for those following a Master's degree relative to the respondents following a Bachelor's degree in 2015. The magnitude of the effect in model 1a is larger with 22.7 pp. Oftentimes, students continue studying for a Master's degree at the same university after finalising their Bachelor's. The completion of a Master's degree is likely to be followed by the transition to the labour market, which comes with a higher level of uncertainty. These results are in line with previous research emphasising that mobility increases with educational level and increased mobility experience (e.g. Kooiman, Latten & Bontje, 2018; Venhorst, van Dijk & van Wissen, 2010).

Having done an internship outside the study region relative to having done an internship within the study region increases the probability to realise the intention to leave by 9.5 pp in model 2b. An effect of 26.0 pp is reported in model 2a, without controlling for selection bias. At the same time, respondents without internship experience relative to those with internship experience in the study region are more

likely to realise the intention to leave (10.5 pp) in model 2b. The same is true for model 2a where we do not control for sample selection, yet the magnitude of the effect is larger (29.4 pp). Thus, respondents who have done an internship within the study region are less likely to realise their intention to leave. Through the internship, recent graduates might have accessed networks, which provided information about labour market opportunities inside the study region respectively and facilitated the transition from higher education to the labour market (Teichert et al., 2018). In line with this, the survey data shows that, on average, respondents who did not realise their intention to leave were unemployed for a much shorter period (1.87 months) before finding their first job compared to all other groups.⁶² This might be an indicator for the important role that unexpected job offers play in retaining graduates who initially intended to leave.

The results show that different forms of resources and opportunities have divergent effects on the realisation of intentions to stay or leave. While regional familiarity increases the propensity to realise the intention to stay, increased human and migration capital, measured through educational level and previous migration experience, have the opposite effect. Intentions to leave the region are more likely realised with increased migration capital and access to employment opportunities through internships outside the study region. Hypothesis H1 supports that individuals with more resources and opportunities are more likely to realise their intention to stay or leave partially for both groups. As expected, respondents who are familiar with the study region are more likely to realise their intention to stay and those with more previous mobility experience are more likely to realise their intention to leave. In general, increased resources and opportunities point more towards leaving the study region, independent of the initial intention, while increases in location-specific capital point more towards staying. This suggests that respondents try to maximize the returns to their resources and might perceive the (labour market) opportunities in the study region as too restricted, which is why they do not perceive immobility as a valid option for their future. As they increase their location-specific capital, these perceptions change and immobility does become an option.

Unexpected events

The results of model 1a indicate that the probability of having realised the intention to stay decreases by 36.5 pp for those who have a broken heart relative to the ones who have no change in their relationship status between wave 1 and wave 2. However, the effect is only marginally significant and no significant effect is reported in the

⁶² Those who intended to stay and stayed were unemployed for 2.76 months, those who intended to stay and left were unemployed for 4.66 months and those who realised the intention to leave were unemployed for 3.03 months.

BPSM (model 1b). Furthermore, the results indicate that the probability of having realised the intention to stay also decreases by 45.8 pp and 18.3 pp for those who found a new love compared to the respondents who did not face a change in their relationship status between wave 1 and wave 2 in model 1a and model 2a respectively. A possible explanation for not realising the intention to stay is that both partners have divergent (im)mobility intentions (Coulter, van Ham & Feijten, 2012). If this is the case, respondents' (im)mobility intentions may have had to be aligned with their partners' plans and it is likely that they move to a place outside the study region, where both of them gain comparatively more from moving (Mincer, 1978).⁶³

Furthermore, the average marginal prediction in the BPSM (model 1b) indicates a higher probability to stay (4.7 pp) for the respondents who did what they expected to do after graduation (e.g. expects to start working after graduation and is indeed working after graduation). In model 1a, without controlling for selection bias an effect of 15.0 pp is found. This suggests that in the absence of unexpected events graduates more likely realise their intention to stay.

We do not find significant effects of unexpected changes in relationship status or activity after graduation on the realisation of intentions to leave. Hypothesis H2 supports that unexpected life-course events can explain why graduates do not realise their initial (im)mobility intention for those with the intention to stay only.

Personality

With respect to the Big Five personality traits, higher conscientiousness increases the probability to realise the intention to stay by 8.4 pp and decreases the probability to realise the intention to leave by 10.7 pp. The significant effects are only found in the models without controlling for sample selection. We therefore find no evidence to reject the null hypothesis H3 that higher conscientiousness increases the probability to realise (im)mobility intentions. In addition, the average marginal prediction indicates a higher probability for higher scorers on neuroticism to realise their intention to stay by 7.5 pp and 2.3 pp in model 1a and model 1b respectively. This contradicts previous research by Jokela (2014), who finds that high scorers on neuroticism are in general less likely to follow their migration desires. Our results might differ as we focus on respondents who are mobile as well as immobile. In addition, our study focusses on mobility intentions rather than desires which are in general more likely to be abandoned (see also Carling, 2019). High scorers on neuroticism are characterised by worrying a lot, getting nervous easily, being sensitive to negative emotions and feelings and are therefore more prone to experiencing fear and anxiety (Jokela, 2014;

⁶³ The dataset does not allow to control for the partners' mobility intentions. Furthermore, note that the exact timing of the second measurement of the relationship status, relative to the actual (im)mobility behaviour is unknown.

Ashton, 2007; McCrae & John, 1992). A possible explanation for our result is that by realising the intention to stay, higher scorers on neuroticism remain inside their comfort-zone and avoid the different costs associated with moving (unexpectedly). We therefore find no evidence to reject the null hypothesis H4 that neuroticism decreases the probability to realise (im)mobility intentions.

Controls

In addition, in model 1a, respondents are more likely to realise their intention to stay by 19.7 pp with a degree in hard science (science, mathematics and computing, engineering, manufacturing and construction). Furthermore, the importance attached to the quality of life in choosing the residency after graduation indicated in wave 1 has a positive impact on the probability of realising the intention to stay in wave 2 by 16.8 pp. The same is true for the result of the BPSM (model 1b), yet with a marginal effect of 3.9 pp. In addition, in model 1b, respondents are more likely to realise the intention to stay by 0.9 pp with increasing age. This is in line with previous research that suggests that mobility decreases with increasing age (Van Wissen, van Dijk & Venhorst, 2011). Last, in the BPSM (model 2b), respondents are more likely to realise their intention to leave if they are working (7.8 pp) or doing something else (7.0 pp) than studying in wave 2. There are no significant effects for the control variables in model 2a.

We additionally apply a series of robustness checks. We pool all respondents together in one regression, instead of applying separate regressions for the respondents who had (1) the intention to stay or (2) to leave. Grouping all respondents together enables us to examine whether the results of the main analysis are robust to changes in the sample size. First, we apply a multinomial logistic regression. Our dependent variable takes four possible outcomes: (1) the intention to stay and not realised, (2) the intention to stay and realised, (3) the intention to leave and not realised, (4) the intention to leave and realised. We use the intention to stay and realised as baseline outcome. In so doing, we compare the stayers who realised the immobility intention with the stayers who did not realise the immobility intention. We find the same results as presented in Table 4.2, model 1a. Next, we use the intention to leave and realised as base outcome which enables us to compare those who realised the (im)mobility intention to those who did not. With the exception of the variable ‘internship during the study’, we find the same results as displayed in Table 4.2, model 2a.

Second, we apply a probit regression with the dependent variable indicating whether one has realised the (im)mobility intention or not. Interaction terms are used for whether (1) respondents indicated to have the intention to stay in the study region or (2) respondents who indicated to have the intention to leave the study region on the same set of independent variables presented in Table 4.2. Again, the results are the same as reported in Table 4.2, with the exception of the significance

of the variables on the relationship transition and the Big Five trait neuroticism. The results of the additional regressions provide evidence to consider the results of the main analysis to be robust.

4.4.3 Interview findings

In this section, we report the most important interview findings and link them to the results of the quantitative analysis. This allows us to better grasp the intervening factors leading to the gap between (im)mobility intentions and behaviour. In addition, through insights into respondents' personal (im)mobility we arrive at a more nuanced understanding of (im)mobility behaviour by disentangling if intentions were not realised because they were changed (voluntarily), respondents failed to realise them, or they postponed them (see Figure 4.1).

Mobility behaviour: change intention, fail to realise intention or postpone intention

For respondents who did not realise their intention to stay, most report work as the main reasons to have left. For some this means that they could not find a job in the region where they studied even though they would have liked to stay (Interviews 5; 25), while others decided to leave for a more suitable and/or better paid job elsewhere (Interviews 4; 6; 10; 24; 27): "I would have stayed, but to me the kind of employer and job were more important than the location" (Interview 10). This suggests that graduates *change* their intentions or *fail to realise* them because of a (perceived) lack of opportunities in the study region or (perceived) better opportunities elsewhere. Another interviewee who had the intention to leave in 2015 had not realised his intention yet because he preferred to remain living in the study region while looking for a job (Interview 17). As he did not expect to find a job in the study region, his move is likely to be *postponed*. This is in line with the theory of planned behaviour which emphasises the importance of 'perceived behavioural control' (Ajzen, 1991) and suggests that individuals are more likely to realise their (im)mobility intentions if they perceive their opportunities to do so as sufficient.

Four interviewees *changed* their plans and actively decided to remain living in the study region despite their initial intention to leave as they received unexpected job offers, for example by the supervisors of their Master's thesis or through a student assistant job (Interviews 12; 13; 14; 16). This can be linked to the quantitative analysis which shows that respondents who have done an internship within the study region are less likely to realise their intention to leave arguably because of improved access to networks and labour market opportunities in the study region. Just like interviewees 12 and 14, it is possible that these respondents were not aware of opportunities in the study region prior to their internship. Therefore, one could argue that not only the realisation, but also the formation of (im)mobility intentions depends on perceived

behavioural control: When graduates do not expect to find a job in the study region because of a perceived lack of opportunities for them, they might think it is necessary to leave. Only if they receive more information, for example through internships, student jobs or other unexpected job offers, they are convinced otherwise. Several interviewees indicated that they could imagine that more graduates stayed in the study region if there were more job opportunities (Interviews 10; 25; 24; 26). Hence, access to employment opportunities is crucial to understand the gap between (im) mobility intentions and behaviour of recent higher education graduates.

Work-related factors triggering (im)mobility are often paired with other factors like distance to partner and social ties (Interviews 4; 6; 10) or a relationship break up (Interview 9). For the interviewees who *changed* their plans and stayed in the region because of unexpected job offers, this was furthermore perceived as very convenient since their partners were living in the same region or close by (Interviews 13; 14; 15): “If I did not have friends and a partner in the study region, I would not have accepted the job” (Interview 14). One interviewee also reported that she stayed because she broke up with her partner with whom she was initially planning to move away. As she received an attractive job offer, she *changed* her plans and decided to remain living in her study region, also because “it feels like home” (Interview 16). Similarly, another graduate decided to remain in the region when a relationship ended because she received a job offer, had become familiar with the region, had found many friends and was active in a sports club (Interview 23). One interviewee explained, that his intention to leave *changed* as he got married and became more settled in the study region. This event also meant that additional factors like the distance to his wife’s family now play a role in choosing his residency, which is something that he had not taken into account in 2015 (Interview 20). Two female interviewees reported that the main reason for them to leave (and thereby *changing* their intention to stay) was to move in with their partner who was living further away (Interviews 15; 21). These are examples for people who *voluntarily changed* their plans because of a shift in priorities. The importance of relationships and changes in relationship status as reported by the interviewees is in line with the quantitative analysis, which suggests that finding a new partner is associated with an increased likelihood not to realise the intention to stay.

For some interviewees, the gap between (im)mobility intention and behaviour resulted from unexpected events which are neither related to work nor relationships. One interviewee decided to leave against her initial intention to stay because, having lived abroad for a while, she could not imagine remaining in Europe anymore, mainly for lifestyle reasons (Interview 3). A participant from India had to leave the region where he studied because of visa issues, but he would still like to come back (Interview 11). This shows that sometimes individuals may *fail to realise* their intentions depending on external influences beyond their control. Six interviewees explained that delayed graduation or enrolment in another study programme led

to the *postponement* of mobility (Interview 1; 2; 8; 17; 18; 20; 22). By the time, they were being interviewed in 2018, three of them had realised their intention to leave (Interview 8; 18; 19).

For many of the respondents, the fact that they actively decided to stay despite the initial intention to leave, does not imply that they will remain living in the region forever. They might still leave at a later point in time (Interview 14; 23). Hence, it is often a combination of factors, mainly work and relationships that lead interviewees to change their initial (im)mobility intention, at least for the time being. We did not notice any differences between the experiences of interviewees who studied in different sub-regions of the EMR. In addition, it is worth mentioning that a number of interviewees had the impression that there are not enough jobs outside academia in some study regions, for example for engineers. They think that more graduates would be able to realise their intention to stay if there were more job opportunities in the industry (Interview 2; 20).

4.5 Conclusion and discussion

The aim of this chapter is twofold. Based on a mixed methods approach, it sets out the factors explaining the relationship between the (im)mobility intentions and behaviour of recent higher education graduates and examines to what extent (im)mobility outcomes reveal recent graduates' preferences for (im)mobility. It views mobility and immobility as equivalent options. Drawing on existing research on the relationship between mobility intentions and behaviour from different disciplines, we develop a conceptual framework that links (im)mobility intentions and behaviour through three groups of intervening factors: resources and opportunities, unexpected events and personality traits. In addition, it highlights that it is not sufficient to analyse if (im)mobility intentions were realised or not, but to differentiate if intentions were not met because individuals changed their intention, failed to realise their intention (i.e. involuntary (im)mobility) or postponed the realisation of intentions.

This study contributes to the literature on the relationship between (im)mobility intentions and behaviour in three ways. First, it focuses on recent higher education graduates, a group that has not been studied in this context so far and that is seen as increasingly relevant in today's competition for talent. Second, it is among the few studies applying a multidisciplinary approach. Third, it is based on mixed methods. Through combining survey and interview data (for contextualisation and triangulation) it helps to arrive at a more nuanced understanding of the intervening factors explaining the gap between (im)mobility intentions and behaviour as well as pointing out the extent to which (im)mobility behaviour reflects individuals' actual preferences.

Our results confirm that (im)mobility intentions are a good predictor of actual behaviour. About 70 percent of our survey respondents had realised their intention within two years after graduation. In line with previous research and our conceptual framework, the remaining gap between (im)mobility intentions and behaviour can be explained through a variety of intervening factors.

According to the results of the quantitative analysis, all three intervening factors identified by the conceptual framework (resources and opportunities, unexpected events, and personality traits) help to better understand the gap between intentions to stay and behaviour. Regional familiarity (location-specific capital), no change in expectations for activities after graduation (i.e. continue studying, working, other), not finding a new partner and higher neuroticism increase the likelihood that respondents realise their intention to stay, while previous mobility, having a Master's degree (human capital), and changes in the relationship status decrease the probability that respondents realise their intention to stay (supporting H1 and H2).

With regard to realising the intention to leave, previous mobility and gaining human capital outside the study region (internship) increase the likelihood that intentions to leave the study region are realised (supporting H1). In contrast to immobility intentions and behaviour, the gap between mobility intentions and behaviour thus seems to be influenced in particular by resources and opportunities. Differing between respondents who expressed the intention to stay and respondents who indicated an intention to leave rather than studying both groups jointly has been proven to be a useful approach. Different mechanisms seem to be at play in explaining the realisation of mobility and immobility intentions.

The qualitative analysis shows that for all interviewees unexpected events like unexpected job offers and changes in relationship status have a strong impact on why (im)mobility intentions were not realised. In one specific case, visa issues explained why the participant failed to realise his intention to stay (i.e. involuntary mobility). Unexpected events were not found to have an effect in the quantitative analyses on realising the intention to leave. Moreover, the interviews show that a (perceived) lack of employment opportunities in the study region and (perceived) better opportunities elsewhere led to changing the (im)mobility intention. Finally, several interviewees postponed the realisation of their intention to leave because of delayed graduation.

The results of this study suggest that following the same sample over a longer period of time is advisable for future research. Two years are not always enough for graduates to realise their (im)mobility intentions. The time needed to complete education as well as to plan and realise one's move may differ from respondent to respondent.

In addition, future research should take into account that it is useful to take a more nuanced approach when comparing (im)mobility intentions and behaviour and when interpreting (im)mobility outcomes. Not realising (im)mobility intentions often has

a negative connotation and is frequently associated with a failure or inability to realise one's intention. This is problematic because as we have shown it does not reflect the process through which individuals go internally between the points in time when intentions and behaviour are measured. Not realising one's intention can be a result of changing, postponing or indeed not being able to act in line with one's earlier indicated preferences (i.e. involuntary (im)mobility). Accordingly, speaking of (im) mobility behaviour as 'revealed preferences' can be misleading because not everyone is able to act in line with their preferences. Future research should explore in more detail which intervening factors lead to different (im)mobility outcomes (i.e changes in intentions, postponement of mobility or failure to realise intentions/ involuntary (im)mobility).

The main limitation of this study is the small sample size on which the quantitative analysis is based. It does not allow for a more detailed analyses by sub-region inside the Euregio Meuse-Rhine. Impact of regional labour market and cultural differences between the sub-regions, separated by country borders, are therefore beyond the scope of our analysis. Such factors might be very interesting to be analysed in future research. Moreover, it is advisable for future research to collect more detailed (e.g. monthly) longitudinal data on the timing of events and changes in intentions to leave or stay in a particular region.

4.6 Appendix

Table A4.1 Full probit models

	Realising the intention to stay	Realising the intention to leave
Resources & opportunities		
Familiar with the region	0.221** (0.0998)	0.00870 (0.134)
Previous mobility	-0.0469* (0.0282)	0.0563* (0.0301)
Degree (Ref. = BA)		
MA	-0.227*** (0.0824)	0.0573 (0.103)
PhD	-0.0543 (0.143)	0.132 (0.205)
Internship during study (Ref.= Yes, inside study region)		
Yes, outside study region	0.0575 (0.0993)	0.260** (0.131)
No	-0.0495 (0.0907)	0.294** (0.142)

Unexpected events		
Relationship transition (Ref.: No change in relationship status between wave 1 & wave 2)		
Broken heart	-0.365*	0.0516
	(0.206)	(0.177)
New Love	-0.458***	0.142
	(0.156)	(0.107)
No change in expectations after graduation	0.150*	-0.0739
	(0.0824)	(0.0981)
Personality		
Conscientiousness	0.0839**	-0.107**
	(0.0420)	(0.0464)
Extraversion	0.0472	0.0175
	(0.0345)	(0.0378)
Agreeableness	-0.00241	0.0749
	(0.0442)	(0.0531)
Openness to experience	-0.00384	-0.0244
	(0.0374)	(0.0419)
Neuroticism	0.0747**	-0.00646
	(0.0366)	(0.0379)
Control variables		
Gender (female)	0.0426	0.00913
	(0.0904)	(0.0973)
Age	0.0209	-0.00768
	(0.0158)	(0.0239)
Study field (Ref. = Soft science)		
Hard science	0.197*	-0.0972
	(0.116)	(0.0994)
Current status (Ref.= studying)		
Working	-0.0101	0.377***
	(0.106)	(0.118)
Other	0.0696	0.281**
	(0.123)	(0.128)
Quality of life important	0.168**	-0.0748
	(0.0726)	(0.0920)
Social ties important	0.0472	0.0143
	(0.0837)	(0.114)
<i>N</i>	118	102
Pseudo R2 based on probit regression	0.2974	0.2516

Note: AMEs are presented, standard errors in parentheses.

The dependent variable takes a value of 1 for having realised the (im)mobility intention.

*** p<0.01, ** p<0.05, * p<0.1

Table A4.2 Binomial probit with selection model including the main equation and selection equation

	Realising the intention to stay	Realising the intention to leave
Resources & opportunities		
Familiar with the region	0.806*** (0.253)	0.0723 (0.232)
Previous mobility	-0.0882 (0.0688)	0.130** (0.0531)
Degree (Ref. = BA)		
MA	-0.888*** (0.293)	0.104 (0.206)
PhD	-0.752* (0.413)	-0.0194 (0.438)
Internship during study (Ref. = Yes, inside study region)		
Yes, outside study region	0.0729 (0.287)	0.593** (0.234)
No	-0.106 (0.224)	0.686** (0.284)
Unexpected events		
Relationship transition (Ref.: No change in relationship status between wave 1 & wave 2)		
Broken heart	-0.750* (0.422)	0.167 (0.451)
New Love	-1.035*** (0.371)	0.226 (0.198)
No change in expectations after graduation	0.405* (0.226)	-0.187 (0.158)
Personality		
Conscientiousness	0.153 (0.127)	-0.122 (0.0937)
Extraversion	0.0816 (0.0951)	0.129* (0.0780)
Agreeableness	0.0861 (0.120)	0.0384 (0.104)
Openness to experience	-0.0405 (0.104)	-0.0913 (0.0855)
Neuroticism	0.195* (0.108)	-0.0406 (0.0806)
Control variables		
Gender (female)	-0.0881 (0.274)	0.152 (0.196)

Age	0.0866*	0.0118
	(0.0481)	(0.0385)
Study field (Ref. = Soft science)		
Hard science	0.408	-0.00301
	(0.325)	(0.207)
Current status (Ref.= studying)		
Working	0.0198	0.624***
	(0.278)	(0.240)
Other	0.0885	0.525**
	(0.352)	(0.205)
Quality of life important	0.381	-0.273
	(0.255)	(0.183)
Social ties important	0.269	0.0806
	(0.245)	(0.193)
	Participated in wave 2	Participated in wave 2
Resources & opportunities		
Previous mobility (2015)	0.0612	0.0577
	(0.0396)	(0.0419)
Degree (Ref. = BA)		
MA	0.190	-0.0358
	(0.152)	(0.143)
PhD	0.362	0.344
	(0.121)	(0.278)
(Unexpected) events		
No partner (2015)	0.0720	0.353***
	(0.125)	(0.111)
Personality		
Big Five Personality traits		
Conscientiousness	0.0513	-0.0699
	(0.0626)	(0.0639)
Extraversion	0.0333	-0.0450
	(0.0537)	(0.0512)
Agreeableness	-0.0579	0.0958
	(0.0638)	(0.0663)
Openness to experience	0.0368	0.0430
	(0.0573)	(0.0600)
Neuroticism	-0.0566	0.0266
	(0.0513)	(0.0517)
Control variables		
Gender (female) (2015)	0.197	-0.0100
	(0.144)	(0.141)
Age	-0.0230	-0.0201
	(0.0176)	(0.0257)

Study field (Ref. = Soft science)		
Hard science	0.162	-0.159
	(0.138)	(0.152)
Quality of life important	0.133	0.150
	(0.140)	(0.130)
Social ties important	-0.220*	0.00315
	(0.129)	(0.156)
Exclusion restrictions		
University email address	0.355***	-0.101
	(0.118)	(0.113)
Win a prize in the raffle	0.548***	1.330***
	(0.189)	(0.401)
<i>N</i>	118	102
<i>Censored N</i>	566	684
<i>Wald chi2(21)</i>	47.40	47.11
<i>Prob > chi2</i>	0.0008	0.0009
Fisher's transformed correlation	-14.9206***	-15.07.927
	-4.8153	-7.8042
(Derived) correlation (Rho)	-1	-1
	(0.0000)	(0.0000)
LR test (indep. Eqns.)(rho= 0): chi2(1)	4.19**	4.65**
Coefficients are presented, standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Note: The dependent variable of the main equation takes a value of 1 for having realised the (im)mobility intention. The dependent variable of the selection equation takes a value of 1 if having participated in the second wave of data collection.

The first part of the table presents the outcome stage; in this case, whether one has realised the intention to stay or leave in the study region, taking the value one if one has realised the intention and zero otherwise. The lower part of the table presents the selection stage, where it estimates whether one participated in the second wave of data collection (1) or not (0). In the selection model, the selection equation should include the same independent variables as also included in the main equation and should additionally include exclusion restriction(s) that are supposed to influence the dependent variable of the selection equation, but not the dependent variable of the main equation (Baum, 2006; Van de Ven and Van Praag, 1981; Heckman, 1979). Both stages contain a series of independent variables grouped into resources and opportunities, unexpected events and personality. We furthermore control for gender, age, study field, current status (working, studying, other), quality of life extremely important, social ties extremely important. In addition, the selection stage controls for two exclusion restrictions: university email address (indicating whether someone received an invitation to participate in the 2017 survey via a university email address)

and price (indicating if respondents wanted to participate in the raffle to win a prize in 2015). These two variables are assumed to influence the participation of individuals in the second wave, but do not influence the realisation of mobility intentions. Column 1, the outcome equation, estimates whether one has realised the intention to stay in the study region. Column 2, the outcome equation, estimates whether one has realised the intention to leave the study region. The outcome equation is estimated conditional on respondents participating in the second wave of data collection. See the main paper for the discussion on the results of the outcome stage.

The selection equation estimates the probability of respondents to have participated in the second wave of data collection. The bottom half of the table in column 1 and column 2 (see participated in wave 2) presents the selection equation. The results in column 1 show that the importance of social ties in choosing your residency after graduation negatively impact the probability to have participated in the second wave. Furthermore, the variables for exclusion restriction (prize variable and the email variable) are significant and positive. The results in column 2 show that having no partner, relative to having a partner positively affects the probability to have participated in the second wave. In addition, the prize variable and the email variable are included as exclusion restriction. The prize variable is significant and positive effect.

5

The geographical psychology of recent graduates in the Netherlands: relating environmental factors and personality traits to location choice

Hooijen, I., Bijlsma, I., Cörvers, F., & Poulissen, D. (2020). *The geographical psychology of recent graduates in the Netherlands: Relating environmental factors and personality traits to location choice*. Research Centre for Education and the Labour Market. ROA Research Memoranda, No. 001 doi:10.26481/umaror.2020001

Hooijen, I., Bijlsma, I., Cörvers, F., & Poulissen, D. (Submitted to Regional Studies)

This chapter is joint work with Ineke Bijlsma, Frank Cörvers and Davey Poulissen. We are grateful for the feedback and suggestions from Arthur Grimes during the special session on Location choice and impacts of interregional migration at the ERSA conference in Cork in 2018. We also thank the participants of this session, as well as the participants of the Migration Conference in Lisbon in 2018, the Belgian Day for Labour Economists in Maastricht in 2019, and the seminar organized by the Institute for Employment Research (IAB) in Nuremberg in 2019. We are furthermore grateful for the feedback and suggestions from Merve Özer and Christoph Meng. We would furthermore like to thank Jim Allen and Jessie Bakens for their suggestions on earlier versions.

Abstract

There is ample evidence from different research disciplines that locational factors such as employment opportunities or the availability of amenities and facilities are a powerful predictor of settlement behaviour. Recent research suggests that citizens' mean personality traits might be an additional predictor of where young people settle themselves. We therefore explore (1) to what extent recent graduates in the Netherlands are geographically clustered with respect to five different personality traits, (2) whether or not the geographical clustering of graduates is intensified when they grow older (3) how regional environmental characteristics are related to personality traits, and (4) to what extent personality traits play a role in graduates' location choice. Our results reveal a distinct geographical clustering of personality traits between different regions in the Netherlands. We also show that this geographical clustering becomes more blurred as graduates age. The results furthermore show robust associations between personality traits and several environmental characteristics with respect to demographic, economic, health, political, socio-cultural, crime and religious outcomes. In addition to this, we show that personality traits play a role in graduates' location choices. The impact of economic factors seems to be larger in determining location choice than the impact of personality traits.

Keywords: personality traits, geographical psychology, recent graduates, settlement behaviour

JEL-codes: J61, R23, D91

5.1 Introduction

Recent graduates are often regarded as the ideal individual to attract and retain as they are considered to be an asset to regional economies for their contribution to economic performance and development (Czaika, 2018). The determinants of graduates' settlement behaviour have therefore increasingly become subject to research during the last decennia (Abreu, Faggian & McCann, 2014; Venhorst, Van Dijk, & Van Wissen, 2010; Faggian, McCann, & Sheppard, 2007a). A substantial strand of literature focusses on human-capital migration models (Greenwood, 1985; Sjaastad, 1962) in understanding settlement behaviour of recent graduates (Venhorst & Cörvers, 2018; Lammarino & Marinelli, 2015). A common conclusion of such models is that economic determinants play a significant role in explaining settlement behaviour of recent graduates. Other scholars have examined the role of the duration one is living in a study region (Teichert, Niebuhr, Otto & Rossen, 2018; Andrews, Clark & Whittaker, 2011) or examined the role of non-economic determinants such as the role or perceptions of social ties, quality of life, amenities, regional familiarity (Hooijen, Meng, Reinold, Siegel, 2017; Imeraj, Willaert, Finney & Gadeyne, 2017; Venhorst, 2012) and find these determinants to be important in understanding location choice. These last approaches have received relatively sparse attention compared to economic factors in explaining the settlement behaviour of recent graduates. Even less weight is given to the role of psychological factors as drivers of internal mobility.⁶⁴ We propose personality traits as a potential explanatory factor in explaining location choice of recent graduates. Studies show that psychological factors are an essential factor in decision-making processes in different life domains (Becker et al., 2012). To our knowledge, there has been no research on the role of personality traits in conjunction with location choice of people within the country in which they have recently graduated.⁶⁵ Our underlying thought is that differences in the psychological make-up of people are an important factor contributing to heterogeneity in settlement behaviour.

⁶⁴ Unless otherwise formulated in the studies we refer to, we use the concept of mobility instead of migration to define the movement, i.e. the residence change, of recent graduates between municipalities in the Netherlands. Mobility is a broader concept that covers different movements including various forms of migration, whereas migration often is defined as long-distance and long-term moves of at least one year (Aybek, Huinink & Mutturak, 2015; King & Raghuram, 2013; King & Findley, 2012). Accordingly, migration is one form of mobility, not all forms of mobility can however be regarded as migration (e.g. commuting, business trips).

⁶⁵ Fouarge et al. (2019) study the probability of having the intention to emigrate and the likelihood to choose for a culturally remote location for different personality traits, using a sample of German students.

The psychological literature does provide us with some first insights on the role of personality traits in migration studies. Research has devoted attention to the role of personality traits on the probability to have the intention to emigrate (Canache, Hayes, Mondak & Wals, 2013; Jokela, 2009) and finds that high scorers on extraversion and openness to experience and low scorers on agreeableness have a higher probability to have the intention to be spatially mobile (Jokela, 2014). Studies not only reveal specific personality traits have impact on mobility intentions but also find robust evidence that particular personality traits are more prevalent in some regions than in others. Furthermore, these studies find significant relationships between personality traits and regional indicators regarding for example economic and political outcomes (Rentfrow, Jokela & Lamb, 2015; Rentfrow et al. 2013).⁶⁶ This might be a result of individuals seeking environments that best fit their personality (Motyl et al. 2014; Rentfrow, Gosling & Potter, 2008). Therefore, personality may not only influence the intention to be spatially mobile but may also impact the settlement location. Following the psychological literature and inspired by the work of Rentfrow and colleagues (2015, 2014) we hypothesize that individuals sort themselves out to regions that breathe out an atmosphere in accordance with their psychological traits. Even though economic and social returns matter in settlement behaviour, if people settle down in places that fit their personalities too this suggests that strategies in attracting certain types of people to environments should go beyond the economic and social forces and should additionally focus on the alignment between the psychological traits and the environmental characteristics.

The starting point of this study is the analysis of self-reported personality traits covering the Big Five personality traits Agreeableness (A), Conscientiousness (C), Extraversion (E), Neuroticism (N) and Openness to experience (O) at the local level. This paper addresses four main questions. First, to what extent are personality traits among recent graduates geographically clustered in the Netherlands? Second, how does the clustering of personality traits of young people develop over time? Third, how do environmental characteristics, such as demographic, social, physical and economic factors correlate with personality traits? Last, to what extent do personality traits play a role in location choice?

This study focuses on the personality traits of recent graduates of universities of applied sciences in the Netherlands. Being new job seekers, recent graduates are geographically more mobile than the average population, which might result in more intense increasing geographical sorting of these graduates relative to other periods in their life course (Venhorst, Van Dijk & Van Wissen, 2011; Fielding, 1992).

66 The spatial distribution of psychological phenomena and the interaction of citizens' mean personality traits with regional characteristics is studied by the emerging field of geographical psychology (Rentfrow & Jokela, 2016). In this paper, personality traits refer to the individual level and personality profiles to an aggregated geographical level.

Geographical clustering of personality traits of recent graduates can also become stronger through *job place sorting*. Hence, individuals with similar inclinations sort themselves out to certain areas that may reflect some personality traits more strongly than others (e.g. Silicon Valley) (Garretsen et al., 2019; Rentfrow, 2010).

We explore the geographical distribution of personality traits based on the residential location of recent graduates of universities of applied sciences one and a half year after graduation and four to eight years after graduation. In this way, we can examine whether the geographical clustering changes throughout time. Our research approach is new in several ways. First, it focuses on a specific subgroup during two moments in their life course rather than analysing geographical differences in the mean personality traits of heterogeneous groups at one moment in time as has been done so far. Second, it analyses a multidisciplinary set of environmental factors that may be correlated to personality traits, therefore contributing to a broader understanding of graduates' settlement patterns. Third, it presents additional explanations to understand settlement behaviour of recent graduates of universities of applied sciences in the Netherlands. In particular, we add to the literature on graduate mobility the exploration of the role of personality traits in settlement behaviour by applying a discrete choice model.

The results illustrate that there exists geographical clustering of personality traits across Dutch regions and that this clustering weakens over time for recent graduates of universities of applied sciences. In addition to this, our results indicate a relationship between specific personality traits and the residential environment. For example, openness to experience and conscientiousness are respectively positively and negatively correlated with indicators of urbanity. Lastly, the results of the discrete choice model suggest that the largest impact on location choice comes from the economic indicators. Personality does affect the perceived attractiveness of environmental factors and therefore influences location choice too. Modelling the interplay between several environmental factors such as the economic and demographic composition, physical green space, crime levels, political environment and their interaction with personality contributes to the understanding of location choice.

The chapter is structured as follows. Section 5.2 provides an overview of empirical findings on settlement behaviour of recent graduates of universities of applied sciences and previous findings on the relationship between different environmental factors and personality traits. The dataset used and the main variables of interest is described in Section 5.3. The section following explains the methodology. The results of this study are outlined and discussed in section 5.5 and 5.6. Section 5.7 and 5.8 conclude and discuss ideas for future research.

5.2 Settlement behaviour, graduates and personality traits

The places in which people live differ considerably with respect to their cultural, social and institutional context, their physical appearance and demographic and economic composition. Places consist of communities shaped by people, in which large groups of local people actively participate, and in which individuals with particular psychological traits may be overrepresented. The psychological traits of groups of individuals may therefore influence or even form a place and contribute to its particular regional character. Over the last decade, research in geographical psychology has revealed profound differences between Big Five personality traits within metropolitan London (Jokela et al., 2015), across regions in Great Britain (Rentfrow et al., 2015), across different American states (Rentfrow et al., 2013; Rentfrow, 2010) and between administrative regions of the Russian federation (Allik et al., 2009). Furthermore, it has identified robust associations between personality profiles of locations and regional indicators such as urban economic growth (Garretsen et al., 2019), the number of entrepreneurial activity (Stuetzer et al., 2018; Obschonka et al., 2013), innovation rates (Lee, 2017) and the level of social capital and political orientation (Rentfrow et al., 2013).

5.2.1 Settlement behaviour among recent graduates

A common observation is that environments with a high stock of human capital foster innovation and economic productivity, provide higher wages and hence attract new highly educated labour market entrants. Higher education institutions are thereby increasingly recognized as important regional key players since they provide regions with a substantial part of the human capital they need. Regional economic development is closely tied to knowledge exchange and creation in which recent graduates with the up-to-date knowledge acquired during their studies play an important role in the knowledge transfer within and across regions (Corcoran & Faggian, 2017; Abreu, Koster & Venhorst, 2014; Faggian & McCann, 2009b; Glaeser, Kolko & Saiz, 2001).

Research on highly-educated graduates' settlement behaviour indicates that economic considerations often are a key element in location choice. Prior research in Italy (Marinelli, 2013) and in England, Wales (Faggian & McCann, 2009c) finds that spatial mobility among recent graduates is particularly directed towards innovative regions. Berck, Tano & Westerlund (2016) find for Sweden that regions with a higher per capita tax base are especially chosen as a location among young adults. Haussen & Uebelmesser (2015) and Krabel & Flöther (2014) also find that spatial mobility flows of graduates towards German regions positively depends on these regions' favourable economic conditions and high shares of human capital. Carree &

Kronenberg (2014) and Venhorst et al. (2011) find that graduates tend to be attracted to Dutch regions that offer ample job opportunities and low costs of living. Studies in Sweden (Ahlin, Andersson & Thulin, 2014), Germany (Krabel & Flöther, 2014), Finland (Haapanen & Tervo, 2012) and the Netherlands (Venhorst, 2012) furthermore find that individuals often leave rural or peripheral regions to settle down in (large) urban areas after graduation. Moreover, recent graduates are on average more mobile compared to individuals at other stages in the life course (Corcoran & Faggian, 2017). In addition, prior spatial mobility increases the likelihood for future mobility (Krabel & Flöther, 2014; Haapanen & Tervo, 2012).

A common conclusion of these studies is that recent graduates are highly mobile and move towards economic prosperous places. However, it remains unclear to what extent the spatial mobility itself actually leads to a positive return on their human capital investment. For the Netherlands, Venhorst & Cörvers (2018) show that the positive significant effects of greater internal graduate mobility on hourly wage rates and a good job match mostly disappear after controlling for self-selection. They point towards unobservable personal traits such as ambition or motivation as underlying factor in receiving positive returns on internal migration. Moreover, studies by Teichert et al. (2018), Hooijen et al. (2017) and Imeraj et al. (2017) point towards components other than economic factors, such as the duration one has been living in an area, the importance of familiarity with the region, the quality of life and social networks underlying spatial mobility or the intention to be spatially mobile. In addition, Fouarge et al. (2019) study the intention to emigrate after graduation using a German sample taking into account the role of personality traits. They find that students scoring high on openness to experience and extraversion are more likely to have the intention to emigrate after graduation in contrast to more conscientious and agreeable students. They furthermore find that the role of the cultural context and the language spoken in the host country is associated with the location choice among personality traits differently. This is discussed in the following section.

5.2.2 Environmental characteristics and the relationship with personality traits

The existing literature on the Big Five personality traits has shown that personality traits are related to environmental characteristics. In this sub-section, we review the findings per personality trait.

High scorers on *agreeableness* tend to be clustered in areas with more elderly, more children and tend to be more satisfied living in spacious areas and in family-occupied households (Jokela et al., 2015). Agreeableness negatively relates to entrepreneurial activity and employment growth (Stuetzer et al., 2018; Obschonka et al., 2013). Agreeable individuals tend to be clustered in areas with more green space (Jokela et al., 2015). This trait is negatively related to votes for conservative candidates in the general

elections (Rentfrow et al., 2015). Furthermore, Rentfrow et al. (2008) find agreeable individuals to be negatively related to higher mortality rates and fewer deaths due to cancer and heart disease. In addition, individuals scoring in this range furthermore show to have strong ties with the communities they live in (social capital) and show prosocial behaviour (social norms) (Rentfrow, 2014; Rentfrow, 2010; Rentfrow et al., 2008). Agreeableness negatively relates to rates of robbery, murder, and property and positively relates to religiosity (Rentfrow et al., 2008). This is in line with the features of agreeableness as it reflects friendly, trusting and kind personalities (Ashton, 2007). Last, high scorers on agreeableness tend to be less geographically mobile (Fouarge et al., 2019; Rentfrow & Jokela, 2016; Jokela, 2009).

For *conscientiousness*, Rentfrow et al. (2015) find a positive association with the proportion of married residents. Obschonka et al. (2013) find conscientiousness to be positively related to state-level entrepreneurial activity and Stuetzer et al. (2018) finds this to be positively related to higher regional employment growth. Lee (2017) finds this trait to be positively related to innovation (patenting) in England and Wales. The positive associations with economic indicators reflect the characteristics of this trait as it is defined by being organized, efficient, self-disciplined and compliant (Ashton, 2007). Conscientiousness is positively related to votes for conservative candidates in the general elections in England and negatively related to votes for labour parties (Rentfrow et al., 2015). Conscientiousness also seems to have a positive association with the regional health situation (e.g. positively related to life expectancy and negatively related to age-standardized mortality rates). Rentfrow et al. (2008) find this trait to be positively related to health-promoting behaviour in states and Rentfrow et al. (2015) find a positive association with life expectancy and a negative relationship with long-term health problems, stroke, cancer and heart disease mortality in British districts. In addition, Rentfrow et al. (2008) find conscientiousness to be negatively related to indicators of social involvement and Rentfrow (2010) finds social capital to be negatively related to state-level conscientiousness. The reasoning behind this outcome is not discussed. Indicators reflecting social factors are usually linked to personality traits extraversion and agreeableness. Last, Ayhan et al. (2017) find a negative association between conscientiousness and the likelihood to move from rural to urban areas using panel data from the Ukrainian Longitudinal Monitoring Survey.

High scorers on *extraversion* tend to be energetic, talkative, and optimistic and enjoy social interactions (Ashton, 2007). Rentfrow et al. (2015) find profound and high levels of extraversion mainly in London and its surrounding districts. Jokela, Elovainio, Kivimäki & Keltikangas-Järvinen (2008) find that highly sociable Finnish individuals aged 15 to 30 are significantly more likely to settle down in urban areas. Oishi, Talhelm & Lee (2015) find that extraverts prefer oceans over mountains and introverts prefer living in mountainous regions in the US. As with demographic density, extraversion also shows to be positively related to economic viability. Extraversion has a positive association to the state-level entrepreneurial activity (Obschonka et al.,

2013) and higher regional employment growth (Stuetzer et al., 2018). Rentfrow et al. (2015) find this trait to be positively related to high levels of education, income and high-status occupations. They furthermore find extraversion to be negatively related to votes for labour parties. Rentfrow et al. (2008) find a negative association with health promoting behaviour. However, Rentfrow et al. (2015) find extraversion to be positively related to long life expectancy and negatively related to long-term health problems, cancer and heart disease mortality. Extraverts tend to have greater social networks, interact and share ideas more often and built networks which positively relates to the socio-cultural composition of the environment. Extraverts are more likely to live in a vibrant and culturally diverse urban environment (Jokela, 2014, 2009) and are socially more involved (Rentfrow et al., 2008). Rentfrow (2010) finds social capital to be positively related to state-level extraversion and Rentfrow et al. (2015) find a positive associations with social diversity (foreign-born residents). Murray et al. (2005) find that mean levels of extraversion are significantly higher in areas with greater accessibility to amenities and opportunities for social interaction in Australia. In addition, extraversion is positively related to rates of robbery and murder and positively related to religiosity in states (Rentfrow et al., 2008). Lastly, for German students who have the intention to emigrate, extraversion has a negative correlation with having the intention to move to more culturally remote countries. Moreover, they are more likely to move to countries where either German or English are official languages (Fouarge et al., 2019).

Individuals scoring high on *neuroticism* are considered to be somewhat moody, sensitive and unstable (Ashton, 2007). Note that these features do not indicate any psychological disorder, and that the individual differences with respect to these traits within regions are usually larger than the regional differences between individuals' mean scores (Costa & McCrae, 2008; Allik & McCrae, 2004). Garretsen et al. (2019), Stuetzer et al. (2018), Rentfrow et al. (2015) and Obschonka et al. (2013) find this trait to be more prevalent in areas that are less economic vibrant and in areas with lower levels of entrepreneurship. Rentfrow et al. (2015) find neuroticism to be positively related to votes for labour parties and negatively related to votes for liberal democrats. Furthermore, neuroticism shows to be negatively related to health-promoting behaviour and life expectancy and positively related to long-term health problems, deaths due to heart disease and cancer (Rentfrow et al., 2015; Rentfrow et al., 2008). In addition, this trait is negatively related to social capital and several indicators of social involvement (Rentfrow, 2010; Rentfrow et al., 2008). Lastly, neuroticism has a negative association with rates of robbery.

Individuals who score high in the range of *openness to experience* are characterized by creativity, curiosity, imagination and intellect (Ashton, 2007). In Great Britain, Rentfrow et al. (2015) find high scorers on openness to experience to be more prevalent in urban areas such as London, Oxford and Bristol. Also, the wealthier regions of the Russian Federation, such as Moscow and St. Petersburg, have high

mean scores of openness to experience in contrast to the least developed regions like Kurgan and Buryatia (Allik et al., 2009). Research furthermore shows that especially urban areas attract individuals scoring high on openness to experience and that high scorers on openness to experience are more satisfied living in densely populated areas and culturally more diverse areas (Jokela et al., 2015). Furthermore, the probability of rural-to-urban migration becomes more likely for high scorers on openness to experience in Ukraine (Ayhan et al., 2017). Rentfrow et al. (2015) find this trait to be negatively related to the proportion of married residents. Allik et al. (2009) and Rentfrow et al. (2008) find a positive association between openness to experience and regional human capital and economic prosperity. Furthermore, like extraversion and conscientiousness, this trait is also positively related to the entrepreneurship-prone personality profile and hence higher regional employment growth (Stuetzer et al., 2018) and state-level entrepreneurial activity (Obschonka et al., 2013). With regard to political behaviour, studies find openness to experience to be positively related to liberal public opinion (Rentfrow et al., 2008), to left-leaning American states (Rentfrow, 2010) and to votes for liberal democrats (Rentfrow et al., 2015). With respect to the health situation, Rentfrow et al. (2015) find this trait to be positively related to life expectancy and negatively related to cancer mortality. This study furthermore finds a positive association with same-sex couples and foreign-born residents in British districts. Lastly, and unlike extraversion, Fouarge et al. (2019) find openness to experience to be positively related to the willingness to emigrate to culturally more remote countries among German students. Together with neuroticism, openness to experience shows the clearest geographical clustering among the Big Five personality traits in different empirical studies (Rentfrow & Jokela, 2016).

5.2.3 How do geographical differences in personality traits emerge?

Several plausible factors are distinguished in the literature in explaining why similarities in personality traits are so apparent among individuals living in close geographical proximity. Genetic and cultural influences, physical environment and selective migration are the main factors which tend to contribute to the origin of similar personality traits among people in close geographical proximity.

The first factor refers to the role of *heritability* of personality traits (Allik & McCrae, 2004). Several studies find that personality traits have substantial heritable components (Vukasović & Bratko, 2015; Bouchard & Loehlin, 2001). For example, Vukasović & Bratko (2015) show that about 40 percent of the variance in personality traits can be accounted for by genetic influences and the remainder can be explained by environmental influences. A second argument reflects the extent in which culture (institutions) and its facets (e.g. values, beliefs, habits, language and religion) interact with personality traits and as such form the behaviour of individuals and groups

(Hofstede & McCrae, 2004).⁶⁷ Studies by Allik & McCrae (2004) and Hofstede & McCrae (2004) find positive associations between mean personality scores, culture dimension scores and geographically proximate cultures. These studies suggest that personality traits can be related to different characteristics of culture. Similar thoughts are discussed by Rentfrow et al. (2008) who refer to this as *social influence*. A third factor refers to the *physical environment*. Characteristics such as climate, green space and densely populated areas could affect the prevalence of certain personality traits. For example, Schaller and Murray (2008) find low scores on extraversion and openness to experience in regions that faced a greater prevalence of infectious diseases. To limit the pathogen transmission people prevent themselves from diseases by being more careful and having less social interaction.

The above arguments are not merely separate reflections on the origin of personality traits but are usually considering different factors that reinforce each other or are intertwined. They furthermore do not outline any causal orderings. They have in common that geographical proximity bonds individuals and the communities or networks they interact in. In social environments with different networks and communities, individuals can influence each other and reinforce behaviour by shared genes, norms and beliefs. These assets may continuously form the shaping and reinforcement of the prevailing personality profile of a place (Rentfrow et al., 2013).

The last argumentation, which is the main focus of this study, refers to *selective migration*. The underlying assumption is that people sort themselves out in places that provide a lifestyle aligned with their own personality traits and the needs that result from these traits (Rentfrow & Jokela, 2016; Rentfrow et al., 2008; Hofstede & McCrae, 2004). For example, high scorers on extraversion and openness to experience are more likely to settle down in economic vibrant and culturally diverse urban environments (Rentfrow & Jokela, 2016). In addition, Motyl et al. (2014) finds that a lower sense of belonging to a geographical area, explained by a misfit between personal and community ideological values, increases the likelihood to leave a community.

The four above arguments indicate that people with similar personality traits are inclined to live close to each other in the same areas or are seeking to move to areas with environmental characteristics that best fit their personalities (argument 4). We refer to this as *personality sorting*. In addition, the distribution of personality profiles across regions may also arise through *job place sorting* over a longer period of time, which may, for example, result into enclaves for the creative class (e.g. Silicon Valley). As such, individuals with similar inclinations sort themselves out to certain areas that may reflect some personality traits more strongly than others (Rentfrow, 2010). Furthermore, the sorting of different personalities into specific areas may reflect

67 We refer to culture as “The collective programming of the mind that distinguishes one group or category of people from another” as defined by Hofstede (Hofstede & McCrae, 2004, p. 58).

heterogeneous preferences and as such influence the provision of amenities and local public goods. The missing chapter in geographical psychology is however whether regional personality differences do indeed emerge from selective internal migration (Rentfrow et al., 2015; Park & Peterson, 2014).

It is important to stress that the relationship between personality traits and the environment can go two ways: either personality traits affect the environment, or the environment exerts an influence on the psychological characteristics of individuals. With regard to the latter, individuals would adapt their personality to fit in their new environment. However, as personality traits are set around the age of twenty (McCrae & Costa, 2003) this can possibly occur during the early stages of life. In addition, different personalities may adapt in a different way to a new environment and it may therefore seem for outsiders that it looks like if personality changes, whereas it is merely a reflection of how personalities interact with the new environment.

5.3 Data

5.3.1 Dataset

Our analyses are based on data from the HBO Monitor, a large internet-based survey administered among recent graduates from universities of applied sciences in the Netherlands.⁶⁸ The Research Centre for Education and the Labour Market (ROA) and DESAN Research Solutions carry out this national survey which targets graduates from all study programs 1.5 year after finishing education. Graduates are asked by email to participate in the survey by using a link and login code. There are 37 universities of applied sciences in the Netherlands (Vereniging Hogescholen, 2018) and the survey covers about 90 percent of the yearly outflow of recent graduates, with a response rate of about 40 percent. These higher educational institutions offer a broad set of vocational educational programmes and the institutions are more or less equally dispersed within the Netherlands. For our study, we include 4 graduation cohorts in the sample (students graduated in 2007, 2009, 2010 and 2011). Respondents were contacted twice: 1.5 year after graduation (defined as t_0), and in 2015, between 4 to 8 years after graduation (defined as t_1). For the follow-up survey at t_1 , mail addresses of the graduates were provided by 80% of the universities of applied sciences that previously participated in t_0 . Furthermore, from the institutes that did not wish to participate again, only the graduates that indicated to be willing to participate in

68 The Dutch higher education system is divided into more research-oriented educational institutions (universities) (N=15) and higher professional educational institutions (universities of applied sciences) (N=37) (Nuffic, 2017).

future surveys were contacted again. The response rate of the follow-up survey at t_1 is 11.2% (Allen, Belfi & Mommers, 2016, pp. 7-10). Only in the follow-up survey the respondents answered a question with respect to their personality traits.

Our dataset includes all respondents whose data on personality traits is non-missing, and whose place of residence 1,5 year after graduation is located in the Netherlands. We exclude graduates who live in a foreign country ($N=53$), whose municipality is not known ($N=1940$) and with missing control variables ($N=192$). This leaves us with 4,500 observations in our sample. Below, we include some descriptive statistics about our data to get a better understanding of the sample and to show that the mobility behaviour of our chosen subgroup is sufficient for our research purposes. The mobility behaviour we describe below is based on a comparison between the place of residence 1,5 year after graduation (t_0) with the place of residence at the time of completing the follow-up survey (t_1).

About 14% of the graduates of universities of applied sciences in our sample lives in a different province (Nomenclature of Territorial Units for Statistics NUTS II, 12 provinces) at t_1 (4-8 years after graduation) compared to their residence at t_0 (1,5 year after graduation). The province of Groningen lost most of these graduates after graduation, whereas central areas such as Gelderland, Utrecht and Noord-Brabant gained the largest share of graduates of universities of applied sciences. On the municipality level, 33% of the students moved between t_0 and t_1 . Only 6.4% of the total sample returned at t_1 to the same residential location as when they were aged 16 years old. In addition, with regard to the association between mobility behaviour and personality traits, low scorers on neuroticism are less likely ($p<0.10$) to move, while controlling for personal characteristics (age, age2, gender, household situation, average grade and looking for job). Furthermore, high scorers on openness to experience are positively associated ($p<0.05$) with mobility when not controlled for these personal characteristics.

Our data demonstrates differences in the likelihood to move among graduates from different study fields. Those with a degree in Agriculture were slightly more likely to move between municipalities between t_0 and t_1 , while the ones with a degree in Humanities and Arts are less likely to move. Lastly, in line with Faggian, McCann and Sheppard (2007b) the data also demonstrates that females are more likely to move.

Due to the relative short time of finding employment and the relatively good job match of recent graduates, it may be easy for regions to retain their graduates by holding them back from moving away.⁶⁹ In addition to the latter, the Netherlands is a relatively small country with a high population and job density: Commuters travel

69 For the whole sample at t_0 , 79% of the graduates found a job directly after graduation, and 95% has found their first job within the first 6 months. 83% works in a job that matches their study field.

an average of 24 kilometres which approximately takes 34 minutes (CBS, 2016b). This indicates that individuals do not necessarily need to move for work-related purposes. Instead personality traits could play a more prominent role in the residential location choice. In this scenario, one might prefer to settle down in a place with a personality profile of the people living there that matches the own personality traits (Venhorst, 2012; Allen et al., 2009).

5.3.2 Variables of interest

The residential location variable serves as dependent variable to analyse the role of personality in location choice. The data includes information on four residential locations in time 1) the place of residence at age 16, 2) the place of residence during the last year of their studies, 3) the place of residence one and a half year after graduation, 4) the place of residence during the follow-up survey (4-8 years after graduation). This is measured at two different moments in time: one and a half year after graduation defined as t_0 and during the follow-up survey (4-8 years after graduation) defined as t_1 . For our analyses on location choice, we focus on the movement between t_0 and t_1 and control for pre- t_0 mobility as previous mobility is a good indicator for future mobility (Corcoran & Faggian, 2017; Krabel & Flöther, 2014; Haapanen & Tervo, 2012; DaVanzo and Morrison, 1981). We assume that recent graduates are particularly focussed on getting a job and that they get more concerned about the environmental characteristics of their place of residence later in life. See section 5.4 for further elaboration regarding our choice to focus on the movement between 1.5 year after graduation and 4-8 years after graduation. Personality traits are measured in the follow-up survey.

Personality traits are commonly measured using the Big Five personality inventory (BFI) which covers agreeableness (A), conscientiousness (C), extraversion (E), neuroticism (N) and openness to experience (O) (e.g. Costa & McCrae, 2008; Ashton, 2007). Studies focusing on regional differences in personality often use the 44-item BFI (BFI-44) rated on a 5-point rating scale ranging from strongly disagree (1) to strongly agree (5) to test the five-factor personality dimensions (Rentfrow, 2014; Rammstedt & John, 2007). In our data, personality is self-reported by using one direct question about each trait:

“To what extent do the following statements apply to you:”

- (A) I find it important that others like me
- (C) I am accurate and efficient
- (E) I am outgoing and social to and with others
- (N) I remain calm in tense situations (r)
- (O) I am open to experiences

Note: (r) = reverse statement. We reverse the scale of neuroticism. Therefore, in the remainder of the chapter a high value on this trait refers to high neuroticism. High values on the other personality traits also refer to high scorers. See also Rentfrow et al. (2015).

Answers to these questions are given on a 5-point scale, ranging from strongly disagree (1) to strongly agree (5).

Multi-item instruments tend to have psychometric advantages over single-item instruments. Single-item instruments, however, are shown to be a reliable and valid measurement for multi-item instruments and are of special advantage in panel studies or in large-scale surveys facets (Rammstedt & John, 2007; Gosling, Rentfrow & Swann, 2003). Rammstedt & John (2007) find support that a 2-item scale of the BFI (BFI-10) is sufficient for large-scale surveys. In addition, personality traits are often measured at one moment in time. Using a large body of empirical evidence, McCrae & Costa (2003) emphasize that personality follows a fairly stable pattern in adulthood. Trait psychologists define adulthood in the decade between age 20 and 30. We therefore assume that the personality traits we measure with a mean age of 32 remain constant over our chosen period in the life course.

The following tables present descriptive statistics on the variables of interest.

Table 5.1 Descriptive characteristics based on the follow-up survey at t_1 (4-8 years after graduation, 2015)

	Variable	N
Background characteristics		
Mean age	32.4	4500
Men	44.4%	1999
Female	55.6%	2501
One-person household	20.9%	941
Two-persons household	73.3%	3299
Living with parents	4.7%	213
Different household	1.0%	47
Average grade during graduation	7.4	4500
Currently looking for (other) paid work	21.4%	962
Not currently looking for (other) paid work ⁷⁰	78.6%	3538
Mobility indicators		
Prior mobility (Mobility between municipalities age 16 to t_0)	49.4%	2237
Mobility (t_0 - t_1)	33.2%	1559

Source: HBO Monitor

⁷⁰ Note that the majority is not currently looking for a job in either to or in t_1 .

Table 5.2 Descriptive sample characteristics of Big Five personality traits, distribution in percentages, self-reported answers in response to statements revealing their traits

Variable	Mean	Std.dev	Scale 1 = low to 5 = high				
			1 not at all	2	3	4	5 Totally agree
Agreeableness	3,6	0,90	1,6	9,2	31,0	43,7	14,5
Conscientiousness	4,1	0,87	0,5	5,2	16,2	42,8	35,3
Extraversion	4,2	0,73	0,1	1,6	12,7	49,2	36,4
Neuroticism (r)	2,4	0,90	16,3	40,6	32,1	10,2	0,8
Openness to experience	4,1	0,78	0,2	2,6	15,7	45,5	36,1

Source: HBO Monitor

5.4 Methodology

First, we use the Getis-Ord G^* statistic per municipality m (G_m^*) to identify clustering of personality traits across municipalities in the Netherlands (Kondo, 2016). Due to the randomness of the personality traits of individuals, calculating the mean of each personality trait per municipality and plotting these onto a map might lead to biased conclusions, as random outliers will make it more difficult to notice patterns in the data, especially when the number of observations in one or more municipalities is relatively low. By using a measure for spatial autocorrelation, we can evaluate whether there are patterns of clustering or dispersion in the region and whether the clusters are statistically significant.

The G_m^* calculates a z-score per personality trait and area. Higher z-scores indicate a clustering of high values (hot spots) in a certain area and smaller z-scores correspond to lower values (cold spots). The p-value determines whether the value is significant. The measurement not only calculates the values per municipality separately, but also takes the values of neighbouring municipalities into account. We make use of a binary spatial matrix to identify neighbours, with value 1 if a neighbouring area falls within a certain threshold distance (see section 5.5.1), and zero otherwise.

For each Big Five trait B_m of municipality m , the G_m^* statistic is given as:

$$G_m^* = \frac{\sum_{n=1}^N w_{mn}(\delta) B_n}{\sum_{n=1}^N B_n}$$

Where N is the total number of municipalities in the Netherlands and the spatial weight $w_{mn}(\delta)$ is the mn -th element of the spatial weight matrix with threshold distance δ . The z -value of this statistic is then used to identify surrounding municipalities within the critical area, with ± 1.96 being equivalent to the 5% significance level, and ± 1.64 being equivalent to the 10% significance level.

Second, we present correlations between mean personality traits within municipalities at t_1 and demographic, economic, physical, political, health and socio-cultural, crime and religious indicators measured at the Local Administrative Units II level for municipalities. Our data mainly stems from Statistic Netherlands and are measured in 2015. Principal Component Analysis (PCA) is applied to each subset of macro-level indicators to both reduce the number of variables in the models in a more digestible manner, and to reduce multicollinearity among variables from the same category. We kept the factor with the highest eigenvalue and confirmed that they were all larger than 1. See Appendix A5.1 for an overview of the categorical variables from the PCA. See Appendix A5.2 for an overview of the variables underlying the PCA. Before applying PCA, if not yet a percentage, the variables are transformed into a percentage from the total number of inhabitants per municipality, and then normalized.

For the final step in the analysis, we estimate a model in which alternative location options are explicitly taken into account. For example, if there is one city with ample job opportunities but a low level of amenities and one city with few job opportunities but a high level of amenities, the decision between the two choices would be dependent on the individual preferences. If a high scorer on conscientiousness finds job opportunities important but attributes less value to amenities it is more likely that this individual will choose the location that offers ample job opportunities but fewer amenities, while an individual with low conscientiousness may be more likely to choose the other location.

To be able to model such a decision-making process, we apply a discrete choice model by means of a mixed logit model (see also Train, 2003). We propose a model in which individuals are assumed to have chosen a municipality from a fixed set of possible municipalities. Every possible location is then characterised by a variety of locational characteristics. While we would ideally include all municipalities in this choice set, it is computationally not feasible to include the full choice set for each individual in our dataset. Therefore, we add 30 alternatives per person. Both the place of residence 1,5 year after graduation (t_0) and 4-8 years after graduation (t_1) (if different) are always included, with the rest randomly selected via simple random sampling. The dependent variable, the choice of residence, is 1 for the place of residence 4-8 years (t_1) after graduation, and 0 otherwise.

The majority of students of universities of applied sciences study at a nearby institute and often remain living at their parental home during their studies (Vereniging Hogescholen, 2018). In addition, Teichert et al. (2018), Haapanen and Tervo (2012)

and Busch and Weigert (2010) find that the probability of recent graduates leaving the study region is the highest in the two years following graduation. By focusing on the mobility and location choice between the places of residence 1, 5 year after graduation and 4-8 years after graduation, we particularly try to model the settlement behaviour of those who have made a decisive location choice, independent of the location of the universities of applied sciences and the place of residence of the parental home. For the purpose of this study, we define location choice as a voluntary choice that consists of two major stages that are interdependent with one another and influenced by personal background characteristics, personality traits and environmental characteristics. One stage defines a choice whether one chooses to stay or to move. Another stage includes the choice for the place of residence in which individuals can choose between many different municipalities.

We include probability weights in our model to account for the unequal probability of a place being selected from the fixed set of location choices, as the place(s) of residence is always included, while the alternatives are chosen with a fixed probability. We control for a list of personal background characteristics P_i (age, age², gender, household composition, grades and looking for job).⁷¹

Our main goal is to examine the interplay between personality traits and environmental characteristics at the Dutch municipality level in the settlement behaviour of recent graduates of universities of applied sciences. Denote E_m as the environmental characteristics of municipality m 4-8 years after graduation and B_i as the vector of Big Five traits of individual i , assumed to be constant in the time period our model covers. The main effect of E_m will denote general desirability of area characteristics (such as the ones defined in Appendix A5.1). The main effect of the vector B_i will capture municipality-specific desirability per personality trait. We are especially interested through which channels personality affects location choice. Therefore, the most important variable of interest is the interaction of area-specific characteristics with personality traits, $E_m * B_i$. For example, if people with a high level of Agreeableness indeed move to areas with more greenery, we expect to see a positive and statistically significant effect of the interaction between the level of Physical green space within a municipality and the level of Agreeableness. In a similar way, we also interact P_i with the environmental characteristics to control for heterogeneity in location preferences resulting from personal background characteristics.

Results are not only driven by the attractiveness of the residential choice (pull factors), but also by the initial residence after graduation and possible deficits that increase the chance someone moves away from this to another municipality (push factors). Let m_o denote the base state for the place of residence for individual i 1,5 year (t_o) after graduation. We include the environmental characteristics of the base

⁷¹ Since model size is a concern, we do not include field of study as a personal background variable. Initial findings moreover suggest that it hardly matters for explaining location choice.

state (E_{mo}) and its interaction with personality ($E_{mo} * B_i$) to refer to heterogenous push factors of the environmental characteristics with respect to the personality traits. Negative coefficients for the environmental characteristics in the base state should be interpreted as a push factor that incite people to move away. Positive coefficients of the pull factors (E_m and $E_m * B_i$) will incite people to move to the respective municipalities. Lastly, we also include a mobility vector φ_{im} that includes distance variable d_{im} , its square d_{im}^2 , and a dummy ζ_{im} that signifies prior mobility between municipalities in the period between 16 years of age and t_0 . For each potential choice of municipality m , this variable measures the distance (in km) between m and their choice of residence at time t_1 for individual i . The idea behind this variable is that there is a cost involved with moving to residences far away. Berck et al. (2016) point out that observed residential location choices are strongly determined by one's initial residence and restricted to a few destinations for which there is a marginally increasing penalty related to moving to residences farther away from one's current residence. The final model looks as follows:

$$choice_{im} = X_{im}\beta + Zu_i + \varepsilon_{im}$$

Where i denotes an individual in our dataset, m is a municipality from the choice set of all municipalities in the Netherlands, $choice_i$ is a dummy that is 1 if individual i lives in municipality m (at t_1) and 0 otherwise, X_{im} is a matrix of independent variables, Z is the unstructured covariate matrix for the random effects u_i for individual i , and ε_{im} is the vector of errors. β denotes the vector with the effects of the above mentioned variables belonging to matrix X_{im} .

We can further split up X_{im} into separate components:

$$X_{im} = \varphi_{im} + P_i + E_{mo} + E_m + B_i + (E_{mo} + E_m) * (P_i + B_i)$$

Here mo is the place of residence for individual i one and a half years after graduation, P_i are the background characteristics of individual i and φ_{im} is the mobility vector containing distance and prior mobility between mo and m .

Furthermore, E_{mo} and E_m denote the area characteristics of municipality mo and m respectively, while $E_{mo} * B_i$ and $E_m * B_i$ denote the interaction effects between the two sets of area characteristics and the vector of personality traits of individual i . The main aim of our paper is to estimate the heterogeneous effects of the environmental factors with respect to these personality traits on location choice.

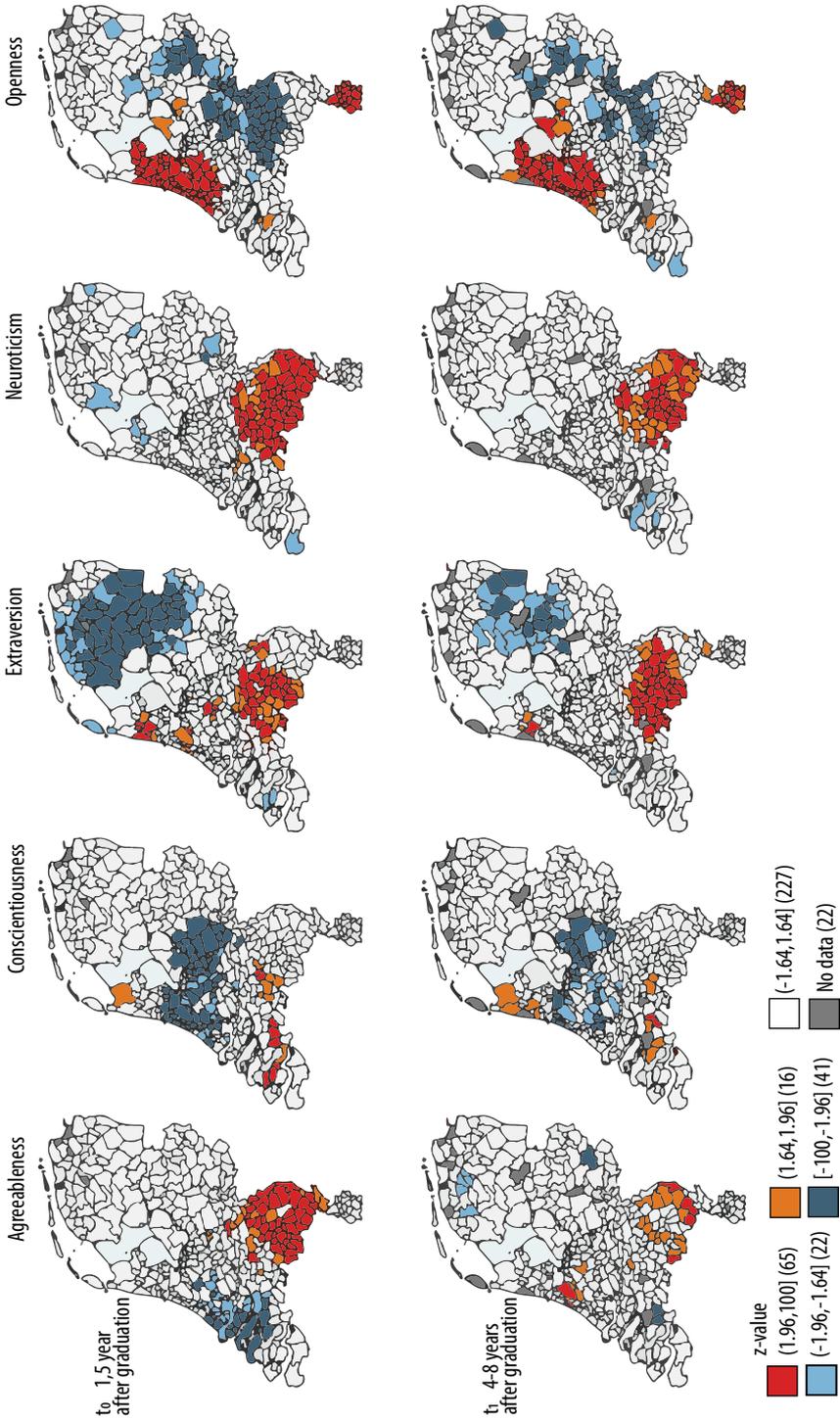
5.5 Personality traits and environmental characteristics

5.5.1 Geographical distribution of personality traits over time

We first examine the extent to which aggregated levels of personality traits are geographically clustered throughout the Netherlands at residential locations 1,5 years (t_0) and 4-8 years (t_1) using a hot and cold spot analysis.

The Getis-Ord G_i^* statistic is dependent on the size of the spatial distance matrix used to identify spatial neighbours. As there is no prior research suggesting an ideal threshold distance, we consider four possible distances: 25, 50, 75 and 100 kilometres. See Appendix A5.3 for the results of this test. The main conclusions are robust for 50 and 75 kilometres. However, because we measure distance linearly, the north-western part of the Netherlands becomes grouped with parts of the north across the water for these larger distances. This is due to the fact that this part of the Netherlands is connected via a long a dike from North Holland to Friesland. Results therefore change accordingly when the distance threshold is increased. Therefore, all maps in this paper will be based on the cut-off of 50 kilometres.

Figure 5.1 Heat maps of the geographical distribution of personality of recent graduates of universities of applied sciences in the Netherlands per municipality 1,5 year and 4-8 years after graduation



Source: HBO Monitor
 Note: 1.96 equals $p < 0.05$ and 1.64 equals $p < 0.1$

The first row shows the distribution of personality traits which is measured by the residential location at t_0 . The second row uses the residential location at t_1 .

The first column on the map at the upper-left side shows high levels of *agreeableness* in the south (parts of the Province of Limburg and the Province of North Brabant) of the Netherlands. This personality trait characterises itself by trust, sincerity, modesty and cooperation. This would suggest that the social ties between the communities in the south of the Netherlands are stronger compared to other regions (Rentfrow, 2014). The provinces of Zeeland and South Holland located in the south-west of the country, next to the western Dutch coastline reveal an opposite image: respondents residing in this region score significantly lower on agreeableness, a personality trait that is associated with rudeness and harshness (Ashton, 2007). The geographical clustering of agreeableness becomes more blurred at t_1 . Furthermore, high agreeableness now seems to be scattered in the Province of North Holland (i.e. in the west of the country), whereas we find low scorers on agreeableness in some northern and eastern parts of the Netherlands at t_1 .

The second column of the figure shows the geographical distribution of the *conscientiousness*. High scorers on this trait are self-disciplined, responsible, systematic and hardworking on average (Ashton, 2007). We find high scorers in parts of the Province of North Brabant, Zeeland and North Holland, while respondents living in the middle and Midwest of the Netherlands (Randstad area and the Provinces Flevoland and Gelderland) score significantly lower. We find a similar distribution in the follow-up survey.

The third column shows the spatial clustering of the personality trait *extraversion* and reveals a prevalent dichotomy in the country. The recent graduates living in the south (North Brabant, Limburg) or in the Randstad area (which also includes some parts of the Province North Holland) tend to be significantly more sociable, talkative, passionate, enthusiastic and energetic, while those living in the Northern provinces (including the Wadden Islands), the east of the country and some municipalities in the Province of Zeeland tend to be more reserved and passive according to the personality trait (Ashton, 2007). We find relatively comparable results at t_1 , yet the high scorers around the Randstad area seem to have disappeared. The image shown is in line with a widely held view that traits such as emotionality are more prevalent in the south than in the north (Pennebaker, Rime, & Blankenship, 1996). For the Netherlands, these differences are expressed in the “hardness” of the people above the river Rhine and the “softness” of the Southerners under the River Meuse. The rivers Rhine and Meuse are the longest rivers in the Netherlands and divide the country into the north and the south (Cornips, 2018; Cornips & Knotter, 2018). In addition, previous studies find that high scorers on extraversion tend to live in more culturally diverse areas and tend to have greater social networks (Jokela, 2009, 2014). As religion shapes people’s values, fosters prosocial behaviour and increases social investment (Putnam and Campbell, 2012; Rentfrow et al., 2008), we argue that this

could be a possible explanation for the differences in extraversion found between the north and south. There used to be a clear divide between Protestants (in the north) and Catholics (in the south) about a century ago and deeply rooted beliefs and values may have been passed on to the next generations.⁷² Protestants are generally viewed as being more individualistic and independent whereas Catholics appear to be more collectivistic. Furthermore, compared to Protestants, Catholics tend to be religious for more extrinsic reasons such as for social support or celebrations (Van Elk, Rutjensa & van Harreveld, 2017). If it is true that culture plays a role in the emerging of geographical differences in personality then the deeply rooted religious differences between the north and south in the Netherlands could possibly explain a part of the differences found. Furthermore, religious differences are still to be found today in the Netherlands (Schmeets, 2016).

The fourth column shows the distribution of the personality trait *neuroticism*. The recent graduates that live in the provinces North-Brabant, Limburg and some municipalities in the province of South Holland tend to be more anxious, moody and possessive whereas the ones living in a few municipalities in the Province of Zeeland and Gelderland and in the northern part of the Netherlands tend to be more relaxed and easy-going according to the personality trait (Ashton, 2007). However, we find very little spots for low scorers on this trait. The image is more blurred in the second row, at t_1 , yet the division as revealed at t_0 remains for the high scorers.

With respect to fifth and last column, *openness to experience*, we find significant and positive results for the graduates living in the west of the country (North and South Holland), in the southernmost part of the Province of Limburg and a few municipalities in Zeeland, Flevoland and Gelderland. The respondents living in the north east of the country (Provinces Drenthe, Overijssel, Gelderland) and parts of North Brabant, Zeeland and a few municipalities of the northern part of the Province of Limburg score low on openness to experience, suggesting that the respondents of these areas are more conventional and -shallower (Ashton, 2007). A similar image is emerging at t_1 . Most of the areas scoring high on openness to experience are considered the most urbanized areas in the Netherlands. The results are in line with previous studies (Rentfrow et al., 2015; Jokela et al., 2015).

We additionally run paired t-tests to determine whether the mean differences between the rows are statistically significant. The results between 1,5 year (t_0) and 4 to 8 years (t_1) after graduation are significantly different at the 5% level. The differences remain significant after restricting the sample size to a minimum of 20 graduates per municipality. These results indeed show that the match between one's personality and the mean personality of the last residential location becomes weaker compared to the match measured 1,5 year after graduation. This finding may indicate that *personality*

72 Some areas in the Randstad area were Catholic, but this is also in line with the hot spots at t_0 .

sorting is not the main factor causing geographical mobility for recent graduates when they make a career some years after graduation.⁷³

5.5.2 Relationship between personality traits and environmental factors

In this section, we present correlations between mean personality traits and environmental characteristics at the municipality level in t_1 to understand how personality traits interact with the environment. By accounting for local environmental characteristics at the municipality level, such as population density, physical appearances, cultural diversity and amenities (number of bars, restaurants, museums etc.), we aim to provide refined measures of locations that may be related to the attractiveness of a place. The following table gives an overview of the relationship between personality traits and the environmental factors that have been revealed from the principal component analysis of the underlying environmental characteristics (see Appendix A5.1). Higher values for these environmental factors indicate a more favourable demographic situation, a better economic viability, a greener physical environment, a more nationalistic political climate, a better health situation, a more attractive socio-cultural environment, a higher crime level or a more religious environment. An overview of the results regarding the relationship between the five personality traits and the indicators of the eight environmental factors is provided in Appendix A5.4.

Table 5.3 Correlations between mean personality traits and environmental factors at municipality level at t_1

Environmental factor	A	C	E	N	O
1. Demographic Development	-	-.057***	-	-	.070***
2. Economic Viability	.024*	-.054***	-	-	.068***
3. Physical Green Space	-	-	.022*	-	.022*
4. Political Populism	-	.039***	-	-	-
5. Health situation	-.034***	.030**	-	-.025**	-
6. Socio-cultural Attractiveness	-	-.057***	-	-	.074***
7. Crime level	-	-.028**	.021*	-	.077***
8. Religiosity	-	-	-.028**	-	-.042***

Source: HBO Monitor

Legend: (A) Agreeableness, (C) Conscientiousness, (E) Extraversion, (N) Neuroticism, (O) Openness to experience

Note: *** $p < 0.01$ ** $p < 0.05$, * $p < 0.1$

⁷³ Recall that personality traits are measured in t_1 while we find evidence of stronger geographical clustering of these traits in t_0 .

All environmental factors measured at the municipality level and listed in Table 5.3 show associations with one or more personality traits. The strongest results are found for conscientiousness and openness to experience. The relationship between conscientiousness and environmental characteristics suggests that this trait is more likely to occur in more suburban and rural areas, being surrounded by a higher share of elderly, a lower population density, less economic hubs, a lower density of amenities and less crime, more populist areas and with better health. The correlation results are in line with previous literature (see also section 5.5.2), except for the environmental factor for economic viability. We will discuss this relationship once more in the next section on the empirical results for the discrete model of location choice. Except for the positive correlation with physical green space, the personality trait openness to experience (artistic, curious, and imaginative) is also in agreement with previous studies and shows to be related with a more urban lifestyle, indicated by a denser demographic and economic composition, more amenities and facilities in proximity, higher crime levels and less religiosity.

We find only a few associations between agreeableness, extraversion and neuroticism on the one hand and the various environmental factors on the other. Moreover, these results are in general statistically less significant. Only the positive association between agreeableness and the health situation is strongly significant and in line with previous literature (Rentfrow et al., 2008). We notice quite some similarities in the correlations between the personality traits and environmental factors, such as conscientiousness and its correlation with the environmental factors demographic development, economic viability and socio-cultural attractiveness. Hence, we test for correlations between the environmental factors themselves.

Table 5.4 shows that Demographic, Economic, Socio-cultural and Crime factors are strongly correlated with each other (>0.8). This indicates that the effects of these four factors cannot be disentangled. The variables have in common that they are all related to living in an urbanized environment. In order to prevent multicollinearity, we decide to focus on the Economic Viability only. We do so because most literature on the mobility of recent graduates conclude that new highly educated labour market entrants are attracted to economic prosperous environments (see section 5.2.1) and less is known about the role the other variables play in the location choice of recent graduates.

Furthermore, there is a strong correlation of 0.79 between Health Situation and Political Populism. We opt to only include Political Populism, because there is a low correlation between this factor and Economic Viability relative to Health Situation. Hence, for our model we include the following four factors: Economic Viability, Physical Green Space, Political Populism and Religiosity. Table 5.4 further shows that there are mainly low correlations between location choice and these environmental factors. Economic Viability reveals the strongest correlation.

Table 5.4 Correlations between environmental factors and location choice of recent graduates of universities of applied sciences at t_1

Environmental factor	Dem.	Eco.	Phy.	Pol.	Hea.	Soc.	Cri.	Rel.
1. Demographic Development	1							
2. Economic Viability	-.93***	1						
3. Physical Green Space	-.37***	-.24***	1					
4. Political Populism	-.29***	-.38***	-.17***	1				
5. Health situation	-.43***	-.53***	-.13***	.79***	1			
6. Socio-cultural Attractiveness	.95***	.88***	-.39***	-.20***	-.31***	1		
7. Crime level	.88***	.82***	.28***	.13***	-.28***	.87***	1	
8. Religiosity	-.01***	-.09***	-.07***	-.23***	-.13***	-.11***	-.05***	1
Location Choice	.17***	.17***	-.03***	-.05***	-.06***	.17***	.16***	-.00

Source: HBO Monitor

Note: *** $p < 0.01$ ** $p < 0.05$, * $p < 0.1$

5.6 The role of personality in location choice

The empirical analyses in the previous sections revealed differences in regional clustering of personality traits and showed significant correlations between environmental factors on the one hand and personality traits on the other. In this section, we focus on the role of personality and its interaction with environmental factors when explaining residential location choice of recent graduates of universities of applied sciences in the Netherlands. We therefore analyse the movements between different locations (municipalities) between 1,5 year (t_0) and 4- 8 years (t_1) after graduation.

In Figure 5.1, we have shown that regional clustering of personality traits significantly weakens some years after graduation. This may suggest that personality traits of young people are clustered by inherited or culturally determined factors, and weakens when they move to other areas, for example for work. This in turn suggests that *personality sorting* does not have the predominant impact on residential location choice some years after graduation. Nevertheless, if there is any form of sorting, we expect people with similar personality traits to move to areas where some environmental factors match particular personality traits, thereby forming clusters of specific personality traits in those areas. However, this does not provide an answer to the question through which channels there is an effect, and how large the impact of these channels is.

We aim to shed more light on the impact of environmental factors on the location choice of graduates with differing personality traits by estimating the discrete choice model we have described in Section 5.4. In Table 5.4, we found several environmental variables to be highly correlated to each other. Therefore, we reduced the number of

environmental factors in the model from eight to four. We divide the results in two tables: Table 5.5 shows the push effects of the four environmental factors, whereas Table 5.6 shows the pull effects of these factors.⁷⁴ We focus in the description of our results on the main effects of the environmental factors as well as their interaction with the Big Five personality traits.

Table 5.5 presents the results of the likelihood to be pushed away from the residential location in t_0 . A positive coefficient indicates that one is more likely to be pushed away from a location. A negative coefficient points to a lower chance that one moves to a new location (i.e. from t_0 to t_1) since one is less likely to be *pushed away* from a residential location at t_0 that strongly exhibits the respective environmental factor.

The first column of our results shows the main effects of the environmental factors, regardless of the personality traits, on residential location choice 1,5 year (t_0) after graduation. With regard to these main effects, we find a coefficient of -0.62 if economic viability increases by one standard deviation (and a decrease of 17.0% if we look at average marginal effects).⁷⁵ There are no statistically significant coefficients for the other three main environmental factors.

The columns following the main effects explore the heterogeneity of the impact of the environmental factors with respect to the personality traits of recent graduates. We do so by estimating the impact of the interaction effects between the personality traits and the environmental factors on residential location choice. We distinguish between low and high scorers on personality traits. We find statistically significant effects for the Big Five traits neuroticism and openness to experience in interaction with several environmental factors. This implies that particularly these two personality traits reinforce the positive or negative impact of the environmental factors.

High scorers on neuroticism are less likely to be pushed away with more greenery from the location at t_0 (-0.011). Furthermore, low scorers on neuroticism are less likely (-0.029) to move from regions with more religious presence in t_0 . For high scorers on the personality traits openness to experience we find that recent graduates are more likely (0.039) to be pushed away from their residential location at t_0 in the presence of more greenery. Less green space might indicate more urban living which is in line with previous studies that find that high scorers on openness to experience are more prevalent in urban areas (Rentfrow et al., 2015; Allik et al., 2009). Furthermore, we find that low scorers on openness to experience are more likely to leave an area as political populism increases (0.135).

⁷⁴ The full regression table can be found in Appendix A5.9.

⁷⁵ We compute average marginal effects for the main effects and for the interaction effects. The marginal effects of the interaction variables are similar to the coefficients of the model (Table 5.5 and 5.6) when $p < 0.05$ (all would fall within its confidence interval), whereas some variables with $p < 0.1$ become less significant.

Table 5.5 Push effects on location choice (location choice dummy), impact of environmental variables with additional environmental effects due to interaction with individual Big Five personality traits (ACENO)

Environmental variables	Interaction effects with Big Five personality traits											
	Main push effects (t ₀)		A		C		E		N		O	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
1. Economic Viability												
2. Physical Green Space												
3. Political Populism												
4. Religiosity												
Source: HBO Monitor												
Legend: (A) Agreeableness, (C) Conscientiousness, (E) Extraversion, (N) Neuroticism, (O) Openness to experience												
Notes: *** p<0.01** p<0.05, * p<0.1												
Controlled for distance, distance ² , prior mobility, main effects of the Big5 and personal characteristics (age, age2, gender, household situation, average grade and looking for job). For interaction variables, we report the effects for high scorers (4= agree & 5=strongly agree) and for low scorers (1= strongly disagree & 2=disagree). The base category is set to 3. Numbers represent the estimated coefficients of the main model. Mind that positive or negative effects can be based on either high or low scorers on personality trait scores.												

Source: HBO Monitor

Legend: (A) Agreeableness, (C) Conscientiousness, (E) Extraversion, (N) Neuroticism, (O) Openness to experience

Notes: *** p<0.01** p<0.05, * p<0.1

Controlled for distance, distance², prior mobility, main effects of the Big5 and personal characteristics (age, age2, gender, household situation, average grade and looking for job). For interaction variables, we report the effects for high scorers (4= agree & 5=strongly agree) and for low scorers (1= strongly disagree & 2=disagree). The base category is set to 3. Numbers represent the estimated coefficients of the main model. Mind that positive or negative effects can be based on either high or low scorers on personality trait scores.

Table 5.6 Pull effects on location choice (location choice dummy), impact of environmental variables with additional environmental effects due to interaction with individual Big Five personality traits (ACENO)

Environmental variables	Interaction effects with Big Five personality traits											
	Main push effects (t ₁)		A		C		E		N		O	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
1. Economic Viability												
2. Physical Green Space												
3. Political Populism												
4. Religiosity												
Source: HBO Monitor												
For legend and notes see Table 5.5.												

Source: HBO Monitor

For legend and notes see Table 5.5.

In Table 5.6, we present the pull effects of the environmental factors in the model, again in interaction with the recent graduates that move. A positive coefficient for a pull factor indicates that one is more likely to be pulled towards a location. The first column of our results shows the main effect of the environmental factors on location choice, regardless of the personality traits, on location choice 4-8 years (t_1) after graduation. Positive coefficients for t_1 serve as *pull factors* indicating that one is more likely to settle down in a new location where the respective environmental factors are strongly present. The main effects indicate that recent graduates are 0.111 more likely to be pulled towards a location (t_1) with Economic Viability (a marginal effect of 8.5%). In addition, we find a main effect for religiosity with a coefficient of 0.190 (a marginal effect of 1.6%). This indicates that recent graduates are more likely to be pulled towards a location (t_1) with more religiosity. Note that for certain scorers of personality traits the effect of religiosity is diminished. As we cannot control for student's religion, this result may be due to a stronger preference for more religious students to move to municipalities with more religiosity that correspond to their own. This leads on average to a pull effect for municipalities with more religiosity.

For high scorers on agreeableness the probability to settle down in a location with more greenery (t_1) is increased by 0.008. Although this effect is relatively small, it is in line with previous literature suggesting that agreeable people are more likely to settle in areas with more green space (Jokela et al., 2015) and less crime (Rentfrow et al., 2008). For high scorers on conscientiousness we find that the likelihood to settle in an area (t_1) decreases with a coefficient of -0.009 with higher economic viability. Our findings are in contrast with Lee (2017) and Obschonka et al. (2013) who find conscientiousness to be positively related to innovation rates (patenting) and state-level entrepreneurial activity respectively. However, Ayhan et al. (2017) find that conscientiousness individuals are less likely to move from rural to urban areas. Even though conscientiousness tends to be associated with high productivity, it does not necessarily indicate that high scorers on this trait also prefer living in economically viable areas. Furthermore, we find that low scorers on conscientiousness are less likely to settle in an area (t_1) with more political populism (-0.037). Conscientiousness is positively related to votes for conservative candidates in the general elections in England and negatively related to votes for labour parties (Rentfrow et al., 2015). In addition, low scorers on this trait are less likely to settle down in an area with more religiosity (-0.20). To the best of our knowledge, there is no previous literature that finds a relation between religiosity and conscientiousness. Also high scorers on extraversion are less likely to be pulled (t_1) to an environment with more religiosity (-0.014).

In sum, the results suggest that the largest effect comes from the economic environmental variable, with both strong push and pull effects. Even though the effect sizes and significance levels differ very much for the interaction variables between

personality traits and environmental factors, the findings indicate that personality does affect the attractiveness of certain environmental characteristics and therefore does influence location choice too.

We additionally apply a series of robustness checks. First, in Appendix A5.5 we present the results for the model in which we include all eight environmental variables. In this model, Economic viability still remains the strongest main predictor, while most effects are merely weakly significant. Furthermore, due to multicollinearity, some expected effects weaken or disappear and are not robust. Second, in Appendix A5.6, instead of dummy variables we treat the Big Five personality traits as continuous variables with the middle of the scale as the base value. We would then expect that the findings for high scorers of a personality trait would have a reverse effect for low scorers (and vice versa). We find quite some changes compared to our earlier results in Appendix A5.5. This suggests that the assumption of treating personality traits as a continuous variable is not the correct specification for our data. Lastly, we estimate the effect of each Big Five trait separately instead of all together as in the main model in appendices A5.7 and A5.8. This hardly changes the conclusions from the empirical estimations.

5.7 Discussion and conclusion

The determinants of spatial mobility and residential settlement of graduates has extensively been explored in the economic discipline and in other social sciences. Economic determinants often appear to be dominant in studies focusing on the settlement behaviour of recent graduates. This is not surprising as most studies focus on human-capital migration models only. Over the last years, studies also started to focus on non-economic migration models in explaining graduate mobility and find that e.g., social ties, quality of life, regional familiarity and the time spent in the study region play a role too. This suggests that the choice for a certain residence is often driven by the interplay of many determinants and cannot be reduced to a few determinants operating in isolation.

In exploring the determinants of settlement behaviour, existing studies somewhat overlooked the role of psychological features in explaining location choice. Research in psychology recently started to devote increasing attention to the role of personalities in spatial mobility. Studies in this discipline not only find that individuals with some personality traits are more likely than average to be spatially mobile but also reveal robust differences between mean personality traits of geographical areas. The different clusters of personality being so apparent in such studies makes it reasonable to suppose that particular areas also attract specific groups of people. However, to date, these studies have primarily focused on the correlation between personality traits and environmental factors and make use of cross-sectional data which limits

the possibility to empirically test whether geographical differences in personality are based on *personality sorting*.

The present study aims to extend previous work and therefore first focuses on the geographical distribution of personality traits of recent graduates of universities of applied sciences and tests the extent to which these evolve over time. The findings demonstrate a clear geographical distinction of personality profiles of recent graduates of universities of applied sciences between Dutch regions. The results for example demonstrate robust clusters of high scorers on extraversion in the southern part of the Netherlands and in the Randstad area, whereas low scorers of this trait are significantly distributed in the north and east of the country, for individuals 1,5 year after graduation. The geographical distribution of this personality trait remains relatively visible, yet statistically weakens over time. This suggests that *personality sorting* is not the main factor causing the geographical clustering of graduates. One of the explanations might be that the differences in the geographical clustering of personality are a result of deeply-rooted differences in culture between Dutch regions, and that settlement in a different place (due to e.g. *job place sorting*) weakens the existence of these regional cultures.

In a next step in our analysis we show the correlations between personality traits and eight different environmental factors. Agreeableness and neuroticism are related to two or one environmental factors, respectively. The three remaining personality traits show correlations with more environmental factors. The graduates maintaining an extravert and open lifestyle seem to be more prevalent in urban environments in contrast to graduates scoring high on conscientiousness who seem to live a rural or suburban way of life. Different personalities may thus value residential locations in a different way.

To better understand the role of personality and its interaction with the environment in explaining residential location choice of recent graduates of universities of applied sciences we apply a discrete choice model as a last step in the analysis. We reduce the number of environmental factors in this model due to multicollinearity. The largest coefficients in the model come from the main effects, suggesting that higher economic viability makes the recent graduates of universities of applied sciences less likely to be pushed away, or more attracted to settle down from their current location or to a new location. Furthermore, more religiosity in a municipality makes graduates more likely to be pulled towards such a location. Furthermore, the findings indicate that personality affects the attractiveness of several environmental factors and therefore does influence location choice too. The effect sizes vary for the interaction between personality and the environmental indicators on residential location choice.

The multidisciplinary paradigm used in this chapter is useful to analyse the extent to which environmental factors and personality traits are related and sets the studies on location choice in a larger context. This furthermore gives better understandings

of the influence that environmental factors may have on residential behaviour. We want to stress, however, that more research is needed and that our study is of an explorative nature.

5.8 Future research

The analyses in this chapter allow us to examine the role of personality traits in settlement behaviour and whether differences in personality profiles between regions emerge via *personality sorting*. The latter has not been explored in previous studies. The substantively and statistically significant images showing the divergence of personalities throughout the Netherlands is intriguing, especially when considering the fact that we make use of a rough assessment of personality profiles. It would nevertheless be of interest to test our findings with richer scales measuring personality traits. Research on cross-national personality differences can potentially have better psychometric properties by greater use of richer scales (Gosling et al., 2003). The study by Lang and colleagues (2011) for example suggest that the 15-item Big Five Inventory (BFI) of personality dimensions measures robust and reliable outcomes. Furthermore, Gosling et al. (2003) acknowledge the use of a ten-item Personality Inventory (TIPI). In addition, Rammstedt & John (2007) find already support that a 2-item scale of the BFI is sufficient in a large-scale survey. Also, panel data measuring personality traits over time can support a better understanding of the extent in which personality traits affect or are affected by the environment. Furthermore, it can be of interest to focus on particular combinations of personality traits instead of analysing traits separately. For example, the southern part of the Netherlands scores high on agreeableness and high on extraversion.

In addition, individuals often rate themselves by their own evaluation of personality traits but could also give their view on personality profiles of different regions. This information could be used in addition to the self-reports of their own personality traits for a broader view (Allik & McCrae, 2004). A study by McCrae and colleagues (1998) however found no differences between observer-ratings and self-reported personality traits among Hong Kong-born Chinese and Canadian-born Chinese.

It is relevant to collect data to study whether the current clustering of personalities traits found throughout the Netherlands generalizes to the average Dutch society, since this study focuses merely on graduates from universities of applied sciences. As such, it could be of interest to additionally compare how the target group in our study relates to the mean regional personality traits. A comparison with recent graduates in other countries, especially in countries where spatial mobility is higher and commuting distances are longer would furthermore be of interest.

Lastly, the regional clustering of personality traits seems to slightly fade away throughout time. This may point to an underlying cause that we could not fully capture. The profound differences in personality profiles between regions may point towards a deeply rooted culture that developed itself through historical events and human interactions. We have discussed that the personality profiles of regions may have been influenced by religious differences. We however believe that linguistic differentiations (local dialects) and Dutch regions that were unequally hit by for example the Spanish flu, flood disasters or bombing might play a role in an even broader understanding of the different personality profiles in the Netherlands. For England and Wales, Obschonka et al. (2018) find that local coal-based industries predict today's psychological make-up of the particular areas, with for example higher neuroticism, lower conscientiousness and lower life satisfaction. A challenge in adding such cultural and historical components is that data, if available, often is presented at a high level of aggregation and that geographical boundaries have also been changing throughout time.

To conclude, expanding the research foci of the residential settlement of recent graduates by including the role of personality traits contributes to a broader understanding of graduates' spatial behaviour and informs our understanding of environmental characteristics and personality divergences in the Netherlands. We hope that the findings of the current study will stimulate further multidisciplinary research on geographical personality profiles and the role of psychological factors in settlement behaviour. We believe that the different assets of behavioural, economic and social disciplines provide insightful information on residential location and instigate future research questions.

5.9 Appendix

Table A5.1 Composition of the categorical variables from the Principal Component Analysis

Variable	Coefficient
Demographic Development	
Urbanisation	-0.03
Population development	0.51
Population density	0.47
Net migration	0.50
Elderly	-0.31
One-person household	0.41
Economic Viability	
Entrepreneurs	0.69
Labour market participation	0.20
Human Capital	0.69
Physical Green Space	
Green space	0.71
Cows	0.71
Political Populism	
	*
Heath Situation	
Diabetes meds	0.57
Heart meds	0.59
Nerves meds	0.55
Mortality rates	-0.16
Socio-cultural Attractiveness	
Distance to facilities	-0.34
Number of bars, restaurants	0.49
Number of museums	0.48
Number of cinemas	0.45
Cultural diversity	0.45
Crime Level	
Thefts	0.71
Firearm crimes	0.71
Religiosity	
Church visits	0.58
No church visits	-0.06
Catholic	-0.11
Protestants	0.43
Islam	-0.11
Religion different	0.37
SGP votes	0.56

* Is a single normalized variable

Source: HBO Monitor

Table A5.2 Description of environmental characteristics at the municipality level

Variable	Description*	Data source
Demographic growth		
Urbanisation	The urbanisation level is divided into 5 categories. Dutch areas with more than 2500 objects per km ² are categorized as highly urbanized. Areas with less than 500 objects per km ² are considered rural (CBS, 2019b)	Statistics Netherlands (2015**)
Population development	Population development by birth, death and migration	Statistics Netherlands
Population density	Number of inhabitants per square meter, calculated by dividing the population by the land surface (rounded to the nearest number)	Statistics Netherlands (2015)
Net migration	Number of persons moved between Dutch municipalities	Statistics Netherlands
Elderly	% of people aged 65 +	Statistics Netherlands
1 HH composition	Number of households with one person	Statistics Netherlands
Economic viability		
Entrepreneurs	Number of entrepreneurs (*1000)	Statistics Netherlands
LM participation	Percentage employed in labour force	Statistics Netherlands
Human Capital	% of inhabitants with a higher education degree (HBO – universities of applied sciences or WO – research universities)	Statistics Netherlands
Physical green space		
Green space	Area dedicated to green space (in ha)	Statistics Netherlands
Cows	Number of cows	Statistics Netherlands
Political populism		
PVV	Percentage of votes for the Party for Freedom (nationalism) in 2017 for the election of the Dutch House of Representatives	Central electoral committee (Kiesraad, 2017)

Health situation			
	Diabetes	% of inhabitants with supplied drugs for diabetes	Statistics Netherlands
	Heart	% of inhabitants with supplied drugs for cardiovascular disease	Statistics Netherlands
	Nerves	% of inhabitants with supplied drugs for the nervous system	Statistics Netherlands
	Mortality	Number of deaths	Statistics Netherlands
Socio-cultural attractiveness			
	Facilities	Distance to facilities such as to a GP or primary school within a radius of 5 km from one's home (per 100 metres)	Statistics Netherlands
	Bars, restaurants	Number of bars and restaurants	Statistics Netherlands
	Museums	Number of museums	Statistics Netherlands
	Cinemas	Number of cinemas	Statistics Netherlands
	Cultural diversity	Calculated by dividing the number of persons who at least have one parent who is not born in the Netherlands by the entire population of LAU II*	Statistics Netherlands
Crime level			
	Thefts	Number of thefts (rounded to the nearest 5)	Statistics Netherlands
	Firearm crimes	Number of registered suspects of firearm crimes (rounded to the nearest 5)	Statistics Netherlands
Religiosity			
	Church visits	% of weekly church attendance	Statistics Netherlands
	No church visits	% not attending a church weekly	Statistics Netherlands
	Catholic	Dummy if Catholic religion is dominant	Statistics Netherlands
	Protestants	Dummy if Protestant religion is dominant	Statistics Netherlands
	Islam	% of Islam religion within the municipality	Statistics Netherlands

Religion different	% of other religions within the municipality	Statistics Netherlands
SGP	Percentage of votes for the Reformed Political Party in 2017 for the election of the Dutch House of Representatives (conservative Christian)	Central electoral committee (Kiesraad, 2017)

*The unit of analysis is municipality level (*Local Administrative Units II), unless stated otherwise.

**Data from Statistic Netherlands stems from 2015, unless stated otherwise

Source: HBO Monitor



Table A5.3a Different specifications of the distance matrix: 25, 50, 75 and 100 kilometers; maps are based on place of residence 1, 5 year after graduation

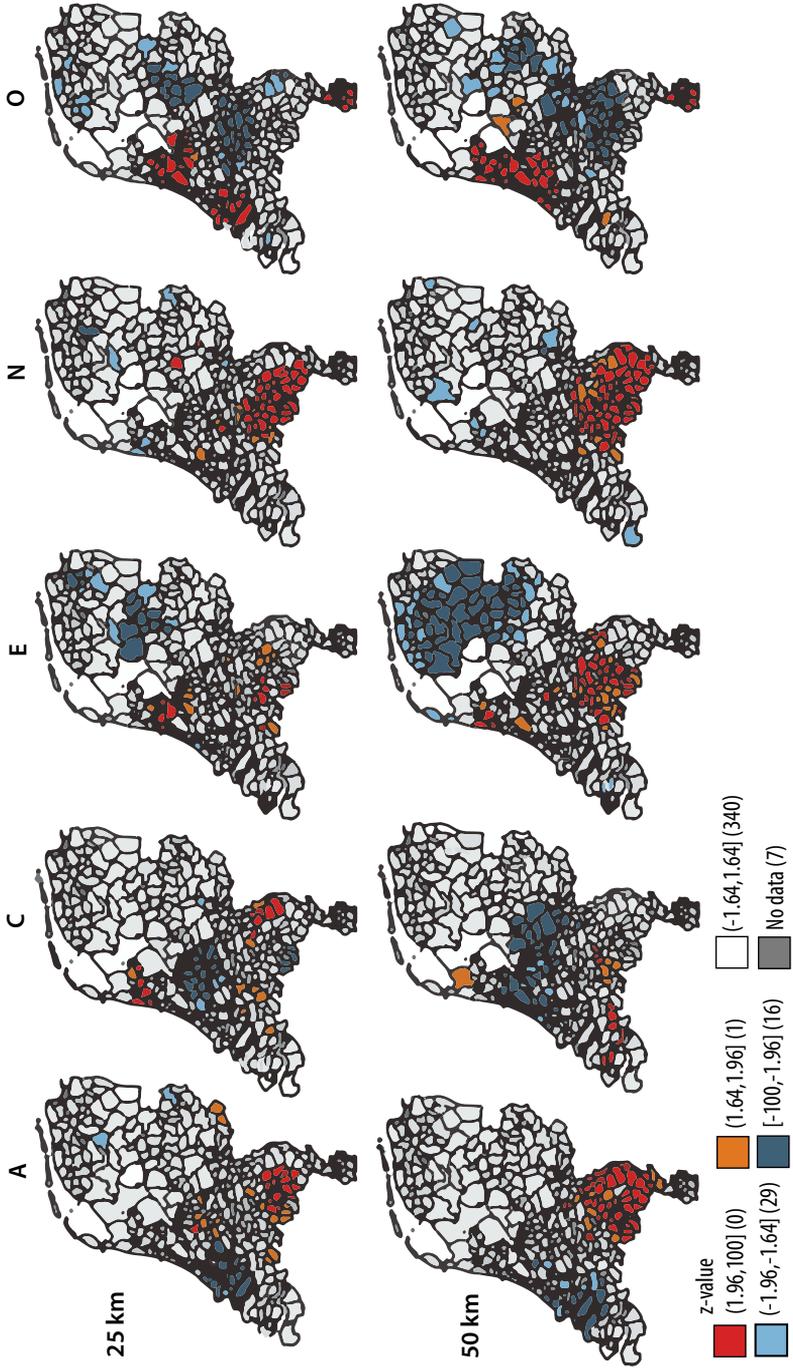


Table A5.3b Different specifications of the distance matrix: 25, 50, 75 and 100 kilometers, maps are based on place of residence 1, 5 year after graduation

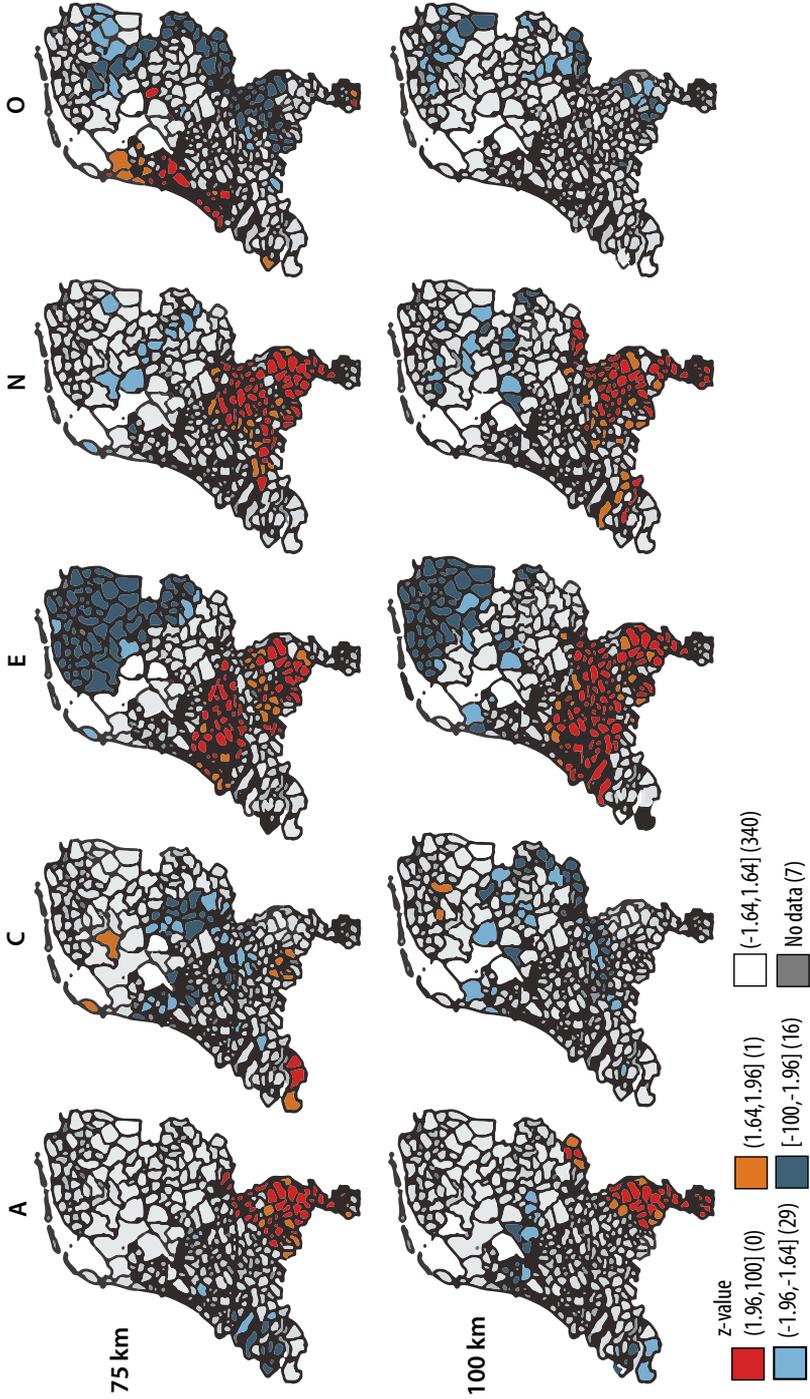


Table A5.4 The relationship between personality traits and the underlying components of each environmental factor, after normalization and grouping of high and low personality traits

	A	C	E	N	O	Sample size
Demographic Development						
Urbanisation	.03**	.06***			-.05***	6718
Population development		-0.06***			0.05***	6718
Population density						6718
Net migration						6718
Elderly		0.06***		-0.02*		6718
1 HH composition		-0.06***		0.03***	0.04***	6718
Economic Viability						
Entrepreneurs		-0.06***			0.05***	6718
LM participation	.02*				-0.02**	6718
Human Capital	.02*	-0.06***		0.04***	0.03**	6657
Physical Green Space						
Green space						3761
Cows						6718
Political Populism						
PVV votes		.05***				6718
Health situation						
Diabetes meds	-.04**	0.02*	-0.03**	-0.02*	0.02**	6718
Heart meds	-.02*	0.05***		-0.03***	-0.02*	6718
Nerves meds	-.03**					6718
Mortality rates						6718
Socio-cultural Attractiveness						
Distance to facilities		0.05***			-0.04***	6718
Number of bars, restaurants						6718
Number of museums		-0.07***			0.04***	6718
Number of cinemas		-0.07***		0.03**	0.04***	6718
Cultural diversity						6718
Crime level						
Thefts						6665
Firearm crimes		-0.05***			0.05***	6718
Religiosity						
Church visits					-0.04***	6661
No church visits		-0.04***				6718
Catholic		0.03**				6718
Protestants		0.02**	-0.03**		-0.03***	6718
Islam		-0.05***	-0.02*		0.05***	6661
Religion different		-0.04***	-0.03**			6661
SGP votes					-0.03***	6718

Source: HBO Monitor

Legend: (A) Agreeableness, (C) Conscientiousness, (E) Extraversion, (N) Neuroticism, (O) Openness to experience.

*** p<0.01** p<0.05, * p<0.1

Table A5.5 Results of the discrete choice model with the full list of factors, impact of environmental variables and interaction effects with Big Five personality traits (ACENO)

Dep. var: Location choice dummy	Main effects				Interaction effects									
	A		C		E		N		O					
	T ₀ Push	T ₁ Pull												
1. Demographic Development														
2. Economic Viability	-.553*				-.177**	.059*								
3. Physical Green Space	-.194**			.010*	.187*	-.074**								
4. Political Populism						.019*								
5. Health situation						.023*								
6. Socio-cultural Attractiveness						-.019*								
7. Crime level	.395**													
8. Religiosity				.058*										
Source: HBO Monitor														
Note: *** p<0.01** p<0.05, * p<0.1														

Distance, distance², prior mobility, main effects of the Big5 and personal characteristics (age, age², gender, household situation, average grade and looking for job also included). For interaction variables, we report the effects for high scorers (4= agree & 5=strongly agree). If the effect was only there for low scorers (1 = strongly disagree & 2 =disagree), we use italics instead. Numbers are given as coefficients of the main model. The base category is set to 3.



Table A5.7 Pull effects on location choice (location choice dummy), impact of environmental variables with additional environmental effects due to interaction with individual Big Five personality traits (ACENO), if we estimate one model per personality trait (results presented together)

Environmental variables	Main push effects (t ₀)	Interaction effects with Big Five personality traits												
		A		C		E		N		O				
		Low	High	Low	High	Low	High	Low	High	Low	High			
1. Economic Viability	-													
2. Physical Green Space														
3. Political Populism														
4. Religiosity														

Source: HBO Monitor

Legend: (A) Agreeableness, (C) Conscientiousness, (E) Extraversion, (N) Neuroticism, (O) Openness to experience

Notes: *** p<0.01** p<0.05, * p<0.1

Controlled for distance, distance2, prior mobility, main effects of the Big5 and personal characteristics (age, age2, gender, household situation, average grade and looking for job). For interaction variables, we report the effects for high scorers (4= agree & 5=strongly agree) and for low scorers (1= strongly disagree & 2=disagree). The base category is set to 3. Numbers represent the estimated coefficients of the main model.

Mind that positive or negative effects can be based on either high or low scorers on personality trait scores. Main effects are only reported in direction, as they differ slightly per model.

Table A5.9 Table 5.5 and Table 5.6 from main text, all variables

Variable	Effect
Economic Viability (t_1)	0.111** (0.050)
Economic Viability (t_0)	-0.620*** (0.211)
Physical Green Space (t_1)	-0.065 (0.052)
Physical Green Space (t_0)	-0.176 (0.166)
Political Populism (t_1)	0.068 (0.085)
Political Populism (t_0)	-0.012 (0.271)
Religiosity (t_1)	0.190*** (0.065)
Religiosity (t_0)	-0.211 (0.162)
Low Agree.	0.011 (0.008)
High Agree.	0.000 (0.005)
Low Consc.	-0.012 (0.011)
High Consc.	0.009 (0.006)
Low Extra	-0.018 (0.019)
High Extra	-0.003 (0.007)
Low Neuro.	0.001 (0.005)
High Neuro.	0.000 (0.005)
Low Openn.	0.002 (0.015)
High Openn.	-0.008 (0.007)
Age	-0.004 (0.003)
Age sq.	0.000 (0.000)

Female (Base: Male)	-0.004 (0.005)
Household Situation (Base: One-person household)	
Two-person household	0.040*** (0.006)
Living w. parent(s)	0.039*** (0.012)
Different household	-0.045** (0.020)
Not looking for job (Base: Looking for job)	0.001 (0.006)
Avg. Grade	-0.003 (0.004)
Economic Viability (t_1) * Age	-0.001 (0.002)
Economic Viability (t_1) * Age sq.	0.000 (0.000)
Female * Economic Viability (t_1)	-0.006 (0.004)
Two-person household * Economic Viability (t_1)	-0.033*** (0.004)
Living w. parent(s) * Economic Viability (t_1)	-0.046*** (0.012)
Different household * Economic Viability (t_1)	0.011 (0.011)
Not looking for job * Economic Viability (t_1)	-0.006 (0.005)
Economic Viability (t_1) * Avg. Grade	0.006* (0.003)
Economic Viability (t_0) * Age	0.019** (0.010)
Economic Viability (t_0) * Age sq.	-0.000** (0.000)
Female * Economic Viability (t_0)	-0.003 (0.018)
Two-person household * Economic Viability (t_0)	0.069*** (0.020)
Living w. parent(s) * Economic Viability (t_0)	0.093** (0.045)
Different household * Economic Viability (t_0)	-0.055 (0.078)
Not looking for job * Economic Viability (t_0)	0.009

	(0.020)
Economic Viability (t_0) * Avg. Grade	-0.000
	(0.014)
Physical Green Space (t_1) * Age	0.002
	(0.002)
Physical Green Space (t_1) * Age sq.	-0.000
	(0.000)
Female * Physical Green Space (t_1)	0.004
	(0.004)
Two-person household * Physical Green Space (t_1)	0.001
	(0.004)
Living w. parent(s) * Physical Green Space (t_1)	-0.002
	(0.009)
Different household * Physical Green Space (t_1)	-0.010**
	(0.004)
Not looking for job * Physical Green Space (t_1)	-0.007
	(0.005)
Physical Green Space (t_1) * Avg. Grade	0.004
	(0.003)
Physical Green Space (t_0) * Age	0.005
	(0.007)
Physical Green Space (t_0) * Age sq.	-0.000
	(0.000)
Female * Physical Green Space (t_0)	0.005
	(0.014)
Two-person household * Physical Green Space (t_0)	0.015
	(0.015)
Living w. parent(s) * Physical Green Space (t_0)	-0.017
	(0.037)
Different household * Physical Green Space (t_0)	0.024
	(0.051)
Not looking for job * Physical Green Space (t_0)	0.004
	(0.016)
Physical Green Space (t_0) * Avg. Grade	0.007
	(0.010)
Political Populism (t_1) * Age	-0.001
	(0.004)
Political Populism (t_1) * Age sq.	0.000
	(0.000)
Female * Political Populism (t_1)	-0.019***
	(0.007)
Two-person household * Political Populism (t_1)	-0.014*
	(0.008)

Living w. parent(s) * Political Populism (t_1)	0.026
	(0.018)
Different household * Political Populism (t_1)	-0.008
	(0.023)
Not looking for job * Political Populism (t_1)	0.008
	(0.008)
Political Populism (t_1) * Avg. Grade	-0.003
	(0.005)
Political Populism (t_0) * Age	0.007
	(0.012)
Political Populism (t_0) * Age sq.	-0.000
	(0.000)
Female * Political Populism (t_0)	0.017
	(0.022)
Two-person household * Political Populism (t_0)	0.018
	(0.025)
Living w. parent(s) * Political Populism (t_0)	-0.100*
	(0.058)
Different household * Political Populism (t_0)	-0.040
	(0.083)
Not looking for job * Political Populism (t_0)	-0.019
	(0.026)
Political Populism (t_0) * Avg. Grade	-0.018
	(0.018)
Religiosity (t_1) * Age	-0.009***
	(0.003)
Religiosity (t_1) * Age sq.	0.000***
	(0.000)
Female * Religiosity (t_1)	-0.008
	(0.005)
Two-person household * Religiosity (t_1)	0.003
	(0.006)
Living w. parent(s) * Religiosity (t_1)	0.008
	(0.013)
Different household * Religiosity (t_1)	-0.020*
	(0.012)
Not looking for job * Religiosity (t_1)	0.007
	(0.006)
Religiosity (t_1) * Avg. Grade	0.002
	(0.004)
Religiosity (t_0) * Age	0.006
	(0.007)
Religiosity (t_0) * Age sq.	-0.000

	(0.000)
Female * Religiosity (t_0)	-0.014
	(0.013)
Two-person household * Religiosity (t_1)~1	-0.009
	(0.015)
Living w. parent(s) * Religiosity (t_1)~1	-0.047
	(0.033)
Different household * Religiosity (t_1)~1	0.058
	(0.048)
Not looking for job * Religiosity (t_1)~1	0.040**
	(0.015)
Religiosity (t_0) * Avg. Grade	0.014
	(0.011)
Low Agree. * Economic Viability (t_1)	-0.005
	(0.006)
High Agree. * Economic Viability (t_1)	-0.003
	(0.003)
Low Consc. * Economic Viability (t_1)	-0.006
	(0.007)
High Consc. * Economic Viability (t_1)	-0.009**
	(0.004)
Low Extra. * Economic Viability (t_1)	0.001
	(0.011)
High Extra. * Economic Viability (t_1)	-0.001
	(0.005)
Low Neuro. * Economic Viability (t_1)	-0.005
	(0.004)
High Neuro. * Economic Viability (t_1)	-0.002
	(0.005)
Low Openn. * Economic Viability (t_1)	-0.006
	(0.011)
High Openn. * Economic Viability (t_1)	0.005
	(0.005)
Low Agree. * Economic Viability (t_0)	-0.000
	(0.029)
High Agree. * Economic Viability (t_0)	0.018
	(0.019)
Low Consc. * Economic Viability (t_0)	-0.001
	(0.040)
High Consc. * Economic Viability (t_0)	0.009
	(0.023)
Low Extra. * Economic Viability (t_0)	0.091
	(0.074)

High Extra. * Economic Viability (t_0)	-0.017
	(0.027)
Low Neuro. * Economic Viability (t_0)	0.018
	(0.018)
High Neuro. * Economic Viability (t_0)	0.005
	(0.030)
Low Openn. * Economic Viability (t_0)	0.031
	(0.056)
High Openn. * Economic Viability (t_0)	0.022
	(0.024)
Low Agree. * Physical Green Space (t_1)	0.007
	(0.008)
High Agree. * Physical Green Space (t_1)	0.008*
	(0.004)
Low Consc. * Physical Green Space (t_1)	0.007
	(0.009)
High Consc. * Physical Green Space (t_1)	0.003
	(0.005)
Low Extra. * Physical Green Space (t_1)	-0.007
	(0.020)
High Extra. * Physical Green Space (t_1)	-0.007
	(0.006)
Low Neuro. * Physical Green Space (t_1)	0.001
	(0.005)
High Neuro. * Physical Green Space (t_1)	-0.011**
	(0.005)
Low Openn. * Physical Green Space (t_1)	-0.014*
	(0.008)
High Openn. * Physical Green Space (t_1)	0.001
	(0.007)
Low Agree. * Physical Green Space (t_1)	-0.027
	(0.025)
High Agree. * Physical Green Space (t_1)	0.000
	(0.015)
Low Consc. * Physical Green Space (t_1)	-0.004
	(0.032)
High Consc. * Physical Green Space (t_1)	0.011
	(0.018)
Low Extra. * Physical Green Space (t_1)	0.011
	(0.055)
High Extra. * Physical Green Space (t_1)	-0.002
	(0.020)
Low Neuro. * Physical Green Space (t_1)	-0.005

	(0.014)
High Neuro. * Physical Green Space (t_0)	0.008
	(0.021)
Low Openn. * Physical Green Space (t_0)	0.067*
	(0.038)
High Openn. * Physical Green Space (t_0)	0.039**
	(0.018)
Low Agree. * Political Populism (t_1)	0.008
	(0.012)
High Agree. * Political Populism (t_1)	-0.006
	(0.007)
Low Consc. * Political Populism (t_1)	-0.037**
	(0.016)
High Consc. * Political Populism (t_1)	0.011
	(0.009)
Low Extra. * Political Populism (t_1)	-0.005
	(0.025)
High Extra. * Political Populism (t_1)	-0.004
	(0.010)
Low Neuro. * Political Populism (t_1)	-0.005
	(0.007)
High Neuro. * Political Populism (t_1)	0.001
	(0.011)
Low Openn. * Political Populism (t_1)	-0.031
	(0.021)
High Openn. * Political Populism (t_1)	0.006
	(0.010)
Low Agree. * Political Populism (t_0)	-0.050
	(0.037)
High Agree. * Political Populism (t_0)	-0.024
	(0.024)
Low Consc. * Political Populism (t_0)	0.033
	(0.054)
High Consc. * Political Populism (t_0)	-0.029
	(0.029)
Low Extra. * Political Populism (t_0)	0.050
	(0.093)
High Extra. * Political Populism (t_0)	-0.008
	(0.035)
Low Neuro. * Political Populism (t_0)	-0.012
	(0.023)
High Neuro. * Political Populism (t_0)	-0.036
	(0.037)

Low Openn. * Political Populism (t ₀)	0.135*
	(0.079)
High Openn. * Political Populism (t ₀)	0.017
	(0.030)
Low Agree. * Religiosity (t ₁)	-0.003
	(0.009)
High Agree. * Religiosity (t ₁)	-0.007
	(0.006)
Low Consc. * Religiosity (t ₁)	-0.020*
	(0.012)
High Consc. * Religiosity (t ₁)	-0.006
	(0.007)
Low Extra. * Religiosity (t ₁)	-0.002
	(0.018)
High Extra. * Religiosity (t ₁)	-0.014*
	(0.008)
Low Neuro. * Religiosity (t ₁)	0.000
	(0.006)
High Neuro. * Religiosity (t ₁)	-0.005
	(0.009)
Low Openn. * Religiosity (t ₁)	0.007
	(0.017)
High Openn. * Religiosity (t ₁)	-0.004
	(0.008)
Low Agree. * Religiosity (t ₀)	-0.006
	(0.023)
High Agree. * Religiosity (t ₀)	0.004
	(0.014)
Low Consc. * Religiosity (t ₀)	-0.018
	(0.030)
High Consc. * Religiosity (t ₀)	-0.009
	(0.018)
Low Extra. * Religiosity (t ₀)	-0.026
	(0.054)
High Extra. * Religiosity (t ₀)	-0.007
	(0.021)
Low Neuro. * Religiosity (t ₀)	-0.029**
	(0.014)
High Neuro. * Religiosity (t ₀)	-0.008
	(0.021)
Low Openn. * Religiosity (t ₀)	-0.018
	(0.046)
High Openn. * Religiosity (t ₀)	0.011

	(0.017)
Prior mobility (dummy)	0.002
	(0.004)
Distance to move	-0.002***
	(0.000)
Distance to move ²	0.000***
	(0.000)
Constant	0.826***
	(0.059)

Source: HBO Monitor

Note: *** $p < 0.01$ ** $p < 0.05$, * $p < 0.1$

For interaction variables, we report the effects for high scorers (4= agree & 5=strongly agree) and for low scorers (1= strongly disagree & 2=disagree). The base category is set to 3.

6

Conclusion and Discussion

6.1 Introduction

Demographic growth and decline affect countries and regions in different ways leading to an unequal distribution of the population between European regions. The demographic structure and its development affect different fields in society, such as the labour market and the economy. Demographic change is considered to be one of the biggest challenges for European regions (European Committee of the Regions, 2020; European Parliament, 2019). Demographic change is among other factors driven by the degree of (im)mobility of people within and between places and plays a significant role in shaping the demographic composition of places. As a consequence, in the context of demographic challenges, the attractiveness of a place has become more topical than ever when focussed on keeping and attracting population. This dissertation intended to provide more insight into various factors that are at play in better understanding the attractiveness of places and the ability of places to attract and retain (new) residents.

Places matter, a place is not only important for the regional economy, it is also important to one's life. The house, street, neighbourhood, province (state) and country one grows up and lives in provide the geographical background against which so many life events occur. These are the places where important life decisions are made. In the Western world, many will consider one's course of study and profession as important life decisions. Another important life decision is the place where one chooses to live. One will most likely take this decision at least once in a life time. While others conscientiously decide to stay in a certain place, others are, or need to be, less attached and are more (in)voluntarily mobile. Some remain living in the same geographical bubble, others move over long distances. The place one chooses to live can determine one's wages, employment opportunities, the people to meet, housing prices, the options available to raise children et cetara. The place(s) one decides to live in can vary much in terms of urbanity, history, social, cultural, economic, demographic, political, climatic and physical characteristics. Many people in the Western world have the luxury of settling in a place that feels the most satisfying, and the citizens of the European Union, who have the opportunity to freely move across its member countries, even more so.

As the studies in this dissertation have shown, various factors are at play in better understanding the ability of places to attract and/or retain (new) residents by analysing the determinants of settlement behaviour. Four empirical studies in this dissertation are conducted which focus on living preferences, (im)mobility intentions, (im)mobility behaviour and location choice respectively. The studies are written from an interdisciplinary perspective, including the application of mixed methodologies. In this concluding chapter, I will first provide a summary of the main findings from the four empirical chapters. The third section reflects on the research framework. Finally, the fourth section discusses further research and policy implications.

6.2 Summary of main findings

Although substantial research is available on the residential location choice of highly skilled people and the attractiveness of urban areas, overviews of residential location choice and the attractiveness of peripheral, rural, and suburban places are scarce. In addition, mainstream approaches to spatial planning policies are based on growth-oriented paradigms. From that perspective, peripheral, rural, and suburban areas often have a less positive connotation. Furthermore, studies on highly skilled people often treat this group as fairly homogeneous, whereas the group is actually large and diverse. *Chapter 2* focuses on people in the fields of science, technology, engineering, and mathematics (STEM), to explore how to attract this target group to a peripheral and demographically changing region in the southernmost part of the Netherlands. The reference for this study is the case of STEM workers in a high-tech business park that has undergone a long transformation period from its coal mining industry days to its biotechnology activities of today. For these workers we explore the residential location choice and use individuals' life satisfaction to reveal the preferred features of the geographical unit in which they reside. Rather than suggesting that the majority of people with occupations in creative and knowledge-intensive sectors prefer to settle down in urban areas, as much of the academic debate and policies imply, our findings from quantitative and qualitative analyses indicate that the average STEM worker seems to prefer a less vibrant lifestyle. The residential location choice of STEM workers revealed in this chapter are often characterised by a suburban lifestyle. The residential area surrounding the high-tech business park is a suitable place to live because of its close green areas and daily amenities and facilities.

Graduates are regarded as the ideal highly skilled individuals to retain, since they are considered a convenient source of human capital to regions and hence to knowledge-based economies. The determinants of graduates' (im)mobility behaviour has therefore become the subject of increasing research during the last decades. *Chapter 3* explores whether prospective graduates intend to stay in a cross-border region after graduation. There is a substantial interest in cross-border cooperation and the factors conditioning its challenges and successes. The region of interest in this study is the Euregio Meuse-Rhine (EMR). The EMR consists of five sub-regions covering the southernmost part of the Netherlands (Limburg Province), the German Zweckverband Region Aachen, the German-speaking Community of Belgium, and the Belgian provinces of Limburg and Liège. The web of knowledge-leading educational institutions in this euregion translates into enormous human capital potential. Although the mainstream literature on graduates' (im)mobility behaviour focuses on hard locational factors, such as labour market opportunities, less is understood of the role soft locational factors (e.g. availability of amenities and facilities) and social factors, such as distance to friends and family, play. Our findings are consistent between the individual sub-regions and indicate that (im)mobility

intentions are determined by individuals' perceptions of the quality of life, openness (i.e. ethnic diversity, tolerance, and ease of making contacts with locals), and career opportunities in the EMR. In addition, having a partner who is living elsewhere and other social ties influence prospective graduates' (im)mobility preferences. Furthermore, individual characteristics, particularly one's place of birth and country, play an important role in choosing one's residency, which emphasises the so-called home preference. (Im)mobility intentions are thus influenced by the interplay of various factors. The largest share of prospective graduates is still uncertain about their future residency towards the end of their studies. Of those who decided already, a larger share intends to leave EMR after finishing their education.

Research on graduate (im)mobility was initially focused on either the determinants of mobility intentions (i.e. stated preferences) or the determinants of actual mobility behaviour (i.e. revealed preferences). Research on the relationship between (im)mobility intentions and actual (im)mobility behaviour, however, is scarce. We, therefore, aimed to contribute to the literature by focusing on the gap between (im)mobility intentions and actual (im)mobility behaviour. *Chapter 4* extends the study presented in *Chapter 3* and analyses the factors explaining the gap between (prospective) graduates' (im)mobility intentions and their subsequent (im)mobility behaviour. The results confirm that (im)mobility intentions are a good predictor of actual behaviour. About 70 per cent of the survey respondents realised their intention within two years after graduation. Different mechanisms seem to be at play in explaining the realisation of mobility and immobility intentions. According to the results of the quantitative analysis, resources and opportunities (e.g. regional familiarity), unexpected events (e.g. changes in relationship status), and personality traits (higher levels of neuroticism) help to better understand the gap between intentions of staying and behaviour. In contrast to immobility intentions and behaviour, the gap between mobility intentions and behaviour seems to be particularly influenced by resources and opportunities (e.g. gaining human capital from outside the study region). The qualitative results confirm these findings and highlight the importance of employment opportunities and (changes in) relationships in explaining the gap between (im)mobility intentions and behaviour. Furthermore, they show that recent graduates mostly voluntarily change their (im)mobility intentions because of a combination of factors, such as unexpected job offers and relationship transitions.

The determinants of spatial (im)mobility and residential settlement of higher education graduates has been explored in the previous chapters of this dissertation. The findings indicate that spatial (im)mobility and residential settlement are influenced by the interplay of various factors. While studies show that psychological factors are an essential factor in decision-making processes in different life domains, existing studies somewhat overlooked the role of psychological features in explaining location choice. *Chapter 5* therefore uses personality traits as a potential explanatory

factor in explaining location choice of recent graduates. The study focusses on the mobility flows of recent graduates of universities of applied sciences between Dutch municipalities. We first examine the extent to which aggregated levels of personality traits are geographically clustered throughout the Netherlands. The findings demonstrate a clear geographical distinction of personality profiles of recent graduates of universities of applied sciences between Dutch regions. The geographical distribution statistically weakens over time, suggesting that the sorting of different personalities is not the main factor causing the geographical clustering of these graduates. Next, correlations between mean personality traits and environmental factors at the municipality level are estimated. The findings point towards a more urban life style for the personality traits openness to experience and extraversion and a more rural or suburban way of life for the personality traits conscientiousness. Lastly, the role of personality and its interaction with several environmental factors in explaining the residential location choices of recent graduates is estimated. The findings indicate that personality affects the perceived attractiveness of these environmental factors and therefore does influence location choice. However, the impact of economic factors seems to be much larger in determining location choice than the impact of personality traits. Thus, economic and social returns matter in settlement behaviour, although personalities play a role too. This suggests that strategies in attracting certain types of people to environments should go beyond the economic and social forces and should additionally focus on the alignment between the psychological traits and the environmental characteristics.

6.3 Reflection on methods, data collection and contributions

Research challenges entail choosing (and handling) the appropriate data and methods. Rarely is there only one way to go about things, and research can be conducted using many different methods. The choice (and gathering) of the data and methods is influenced by a variety of factors, such as the reason for the research, the types of questions being asked, and the nature of the research population. In addition, most research topics can be approached from a range of different (theoretical) positions, which are, among other things, influenced by the researcher's disciplinary background. The studies in this dissertation are written from an interdisciplinary perspective and co-authored by a multidisciplinary team. I have been well aware that a multidisciplinary team would approach the same research topic in different ways and be likely to emphasise different (theoretical) concepts, partly because of our different disciplinary backgrounds in sociology, demography, (labour) economics, and econometrics, but also simply because we are different people with different personalities and thoughts. I favour an interdisciplinary perspective and working with a multidisciplinary team. In my opinion, this leads to greater creativity and

critical thinking and reaches a wider audience. This section reflects upon the research framework developed in the different chapters.

An extensive part of the data used in *Chapter 2* has been collected in a project commissioned by several municipalities and public and private institutions. The purpose of the research was thus not only to contribute to academic research but also to inform policymakers who commissioned the study. An online survey was developed jointly with colleagues specialised in urban design and design of public space. The questions in the survey were based on a literature review and explorative fieldwork. One of the merits in developing your own survey is that it is in fact custom built. However, it was a challenge to keep the survey relatively simple and straightforward in order to capture and gather the data we aimed at. Furthermore, we faced several shortcomings with the approach. First, we do not have any certainty whether or not the target population coincides with the population sampled. Second, there is a non-response bias as the characteristics of those who accept participating in the survey and those who decline participation are distinct. Third, we do not have an overview of the exact number of employees at the HTBP and we can therefore not give a precise indication of the representativity of the sampled population. In addition, developing a good survey is a process that involves many different steps, getting different stakeholders on board, developing a survey instrument, piloting the approach, making necessary modifications and managing and analysing the data. For analysing the data, we used an ordinary least square (OLS) regression which was a very straightforward strategy with our small sample and research question. In addition, for the analysis, we combined the survey data with characteristics of the municipalities the respondents are living in. This certainly added to our understanding of the residential location choice. However, it did not address very specific aspects of the living environment. Given the restricted data sample, the quantitative analyses only focus on the municipal level and might therefore miss out on neighbourhood and street level effects. Analyses on a lower geographical scale (e.g. neighbourhood, street) is extremely relevant to specify the residential location choices more precisely. For example, a multilevel regression could have further improved the quality of the analyses, allowing for simultaneously including effects at the municipality, neighbourhood or even street level. Our sample size does however not allow us to run analysis on lower geographical scales than the municipality level. Furthermore, we might not capture all municipality characteristics that might be driving residential location choice. Hence the results should be written with caution. Therefore, it has been proven very useful in this study to employ a mixed-method approach by undertaking additional interviews to provide a deeper understanding of the research question and to put more context to the living environment.

The empirical study of life satisfaction has become a systematic scientific and policy endeavour over the last decades. A key assumption in our analysis is that individuals are expected to settle in an environment considered the most desirable and

attractive and we therefore can better understand their residential location choice and the municipality characteristics they prefer. Furthermore, we do not argue that the explanatory variables may have an unambiguous effect on life satisfaction, since it is often an interplay of different factors that fulfil individuals' desires. A shortcoming is that we do not have assurance that an individual living in a certain municipality with particular characteristics, also really prefers these characteristics, because it can also be the result of some self-affirming inductions from correlation coefficients (Storper and Scott, 2009, p. 154). Although several (cross)-national studies have stressed the topic of life satisfaction and place (often related to economic indicators), relatively few studies have addressed the impact of life satisfaction on a smaller geographical scale, such as at the municipality level. Based on an extensive literature study on the relationship between the life satisfaction and residential location choice of individuals, we select a range of individual-specific place variables for the analytical framework. We show an association between different municipality characteristics and an individual's life satisfaction, suggesting that the characteristics of municipalities have an independent impact on life satisfaction. This result contributes to the academic literature that uses life satisfaction as a useful tool to understand residential location choice and its municipality characteristics. Furthermore, studies on highly skilled people often treat this group as fairly homogeneous, whereas it is actually large and diverse. We contribute to the literature by focusing on a more specific subgroup. In addition, we extend the academic literature by focusing on STEM workers in a peripheral region and in a demographically changing context.

The move towards a knowledge-based economy has resulted in increasing global competition for human capital and has encouraged many scholars to examine the determinants of highly skilled mobility. Since higher education graduates are considered a central source of human capital, many scholars have analysed the determinants of graduate mobility. Despite the vast amount of literature on graduate mobility, no specific theory specifically explaining the (im)mobility of recent or prospective graduates has been developed. However, a substantial strand of literature focuses on human capital migration models in explaining the mobility flows and decisions of (prospective) graduates. Such studies often conclude that economic considerations, such as labour market opportunities, are a key element in understanding the mobility flows and decisions of (prospective) graduates. In Chapter 3, on the basis of an extensive literature study based on the determinants of highly skilled mobility in general and graduate mobility in particular, we developed a survey to study the (im)mobility intentions of prospective graduates in EMR. The research was not commissioned by other stakeholders, as in the case in *Chapter 2*. From that perspective, the cost and time demand of convincing and obtaining the approval of higher educational institutions, in this case, to start the research are generally higher. Approaching respondents and being able to elicit credible information can thus be a challenge. The advantages of the data collected were that the survey is

custom built for the research project and covers the geographical area we aimed at. The survey included several faculties of five higher education institutions in the EMR (RWTH Aachen, FH Aachen, Universiteit Hasselt, Maastricht University and Zuyd University of Applied Science). The sample covers less than five percent of all students in the EMR. Therefore, the results are not generalizable for the whole study population in the EMR. Furthermore, it would have been helpful to get more different faculties on board, especially considering that the field of study influences graduate (im)mobility as it determines the extent to which jobs are available in the region. For instance, graduates from the field of economics are arguably more flexible than graduates of the field of healthcare. As a result, we might miss out on a representative overview of (im)mobility flows. This leads to a coverage error as the list we draw the sample from is incomplete. Furthermore, we acknowledge non-response bias, because the characteristics of those we participate in the survey and those who decline participation are might be distinct. In addition, a link to the survey was distributed via the faculties to the student email accounts. Students could indicate if they wanted to enter a raffle to win a price upon completion of the survey. This may have increased the response rate. For analysing the data, we used the distinction between prospective graduates who had the intention to stay or leave, or had an uncertain intention to estimate a multinomial logistic regression. The results of a Hausman-McFadden test emphasized that a model including the three groups is the correct specification. Furthermore, applying a stepwise approach has shown to be relevant as this enabled us to analyse the impact of the different determinants more specifically.

We cluster the determinants of (im)mobility according to four factors: hard locational factors, soft locational factors, social factors, and individual characteristics. The four factors should not be seen as mutually exclusive, but, rather, as complementary. We contribute to the academic literature by also acknowledging the role that other factors besides hard location factors can play in explaining (im)mobility intentions. Furthermore, we treat staying in the study region (i.e. immobility), leaving the study region (i.e. mobility), and being uncertain about (im)mobility intentions as equivalent options, thereby moving away from the so-called mobility bias in migration research, which predominantly focuses on explaining mobility flows only, considering immobility to be the norm and often disregarding uncertain choices. Lastly, we extend the academic literature by adding a Euregional dimension, rather than studying graduate (im)mobility in a system of only bordered national areas.

The study we present in *Chapter 4* extends the data collection of *Chapter 3* by again observing the same survey respondents after approximately two years. This was challenging due to the risk of panel attrition. However, the panel data allow us to follow the same cohort and to learn more about the relationship between (im) mobility intentions (the focus of *Chapter 3*) and actual (im)mobility behaviour after graduation (the focus of *Chapter 4*). About 60 per cent of the prospective graduates

who participated in the study presented in *Chapter 3* (in 2015) agreed on approaching them again. We approached them via email two years later (in 2017), reaching a response rate of 14 per cent compared to the whole sample in 2015. In contrast to the data collection in *Chapter 3*, the follow-up survey required several reminders to participate in the survey as the response rate remained relatively low. One of the reasons for the relatively low response rate can be that some graduates provided their university email address to be approached again, instead of their private email address, which decreased the chances of participation in the 2017 survey. We did not specifically ask for the private email address. Probit regressions were estimated to better understand the relationship between the initial (im)mobility intention and actual behaviour. The non-random sampling approach gave reason to suspect that the probit regression suffers from sample selection bias. Estimating probit regressions and controlling for sample selection has therefore been conducted. Existing literature on the relationship between (im)mobility intentions and behaviour is mostly based on quantitative methods. This study contributed to the field of research methodologically by using mixed methods. This helped to arrive at a more nuanced understanding of the intervening factors explaining the gap between (im)mobility intentions and behaviour as well as pointing out the extent to which (im)mobility behaviour reflects individuals' actual preferences.

The relationship between mobility intentions and actual behaviour at the individual and household levels has received only minor attention from different academic disciplines and multidisciplinary approaches. To our knowledge, no studies have analysed the factors explaining the relationship between (prospective) graduates' (im)mobility intentions and their subsequent (im)mobility behaviour. Regarding this relationship, we would like to emphasise the following: 1) Different concepts referring to the prospects of mobility (e.g. mobility aspirations, considerations, plans) are being used in both theoretical and empirical work on mobility decision making. This is important to keep in mind when reviewing and comparing the literature on the relationship between migration intentions and behaviour, because the extent to which intentions or related concepts are realised is likely to depend on how they were measured. 2) The concept of mobility accounts for a diverse range of mobility outcomes, including moves over short and long distances, within and across countries, for various time spans and reasons. 3) Previous research has usually emphasised moving intentions and disregarded the option of staying as a valid alternative to moving.

Much of the research on the relationship between mobility intentions and actual behaviour draws on the theory of planned behaviour, its forerunner, the theory of reasoned action, or a combination of both. The theory of reasoned action assumes that behaviour is preceded by intention, and therefore intentions predict behaviour. However, not all individuals realise these intentions, and it is this gap that we study in *Chapter 4*. Based on an extensive literature review on the relationship

between mobility intentions and behaviour from different disciplines, a conceptual framework is developed, linking (im)mobility intentions and behaviour among three groups of intervening factors: resources and opportunities, unexpected events, and personality traits. The study contributes to the literature by not only focusing on recent higher education graduates – a group that has not been studied in this context so far and that is seen as increasingly relevant in today’s competition for talent – but also being one of few studies applying a multidisciplinary approach. The literature on the relationship between migration intentions and behaviour is mostly based on quantitative methods.

A substantial strand of literature focuses on human capital migration models in understanding the settlement behaviour of recent graduates. In contrast to economic factors, non-economic factors, such as the roles or perceptions of social ties, quality of life, and amenities, have received relatively sparse attention. Even less weight has been given to the role of psychological factors in understanding settlement behaviour. The psychological literature provides some first insights on the role of personality traits and not only reveals the impact of specific personality traits on mobility intentions, but also finds robust evidence that particular personality traits are more prevalent in some regions than in others. These studies furthermore find significant relationships between personality traits and environmental factors, such as economic and political outcomes.

In *Chapter 5*, we develop a conceptual framework based on an extensive literature review, using insights from different disciplines on the settlement behaviour of recent graduates, geographical differences in personality traits, and the relationship between environmental characteristics and personality traits. To our knowledge, no studies have focused on the role of personality traits in conjunction with the location choices of people within the country of the university from which they recently graduated. Our study contributes to the literature by analysing the settlement behaviour of recent higher education graduates in a multidisciplinary approach. In contrast to the three other empirical chapters in this dissertation, this chapter uses existing data. The cost and time investments in gathering and processing the dataset are therefore much lower compared to previous chapters. Although the data are custom built in the previous chapters, the study in *Chapter 5* depends on the variables and measures available in the dataset. This is not necessarily a drawback, but it is relevant to reflecting upon the original purpose of the dataset and research purpose of *Chapter 5*. In particular, *Chapter 5* contributes methodologically to the field of research by applying a discrete-choice model that explores the role of personality and its interaction with the environment in the settlement behaviour of recent graduates.

6.4 Further research

Although the findings of the empirical studies are a good starting point for a better understanding of how to attract and retain highly skilled and talented people to regions, questions still remain to be answered, as well as issues on which to focus. Based on the results of this dissertation, I would like to highlight several overall suggestions for further research (see also the concluding section of each chapter for detailed suggestions for further research) in the following three areas: 1) data collection, 2) place-based research and different geographical units, and 3) a multidisciplinary and interdisciplinary approach. In addition, the research findings in this dissertation can be used as inspiration for policymakers and offer a relevant contribution to the ongoing discussions about (regional) competition for the highly skilled. The contribution of scientific evidence in policy design is not always self-evident, and vice versa. I am in favour of allowing academics to engage more in the work of policymakers and professionals, as well as with the voices of the public. In my opinion, this will render academic research more relevant and interesting. The integration of scientific evidence, policy, and practice with each other will create a more holistic perspective.

Data collection

Although the data used in *Chapter 2* provide information on a specific case and moment in time, they do not inform us about living preferences and demographic changes over time. Panel data would be needed to address these issues, supporting further effective policy designs, and allowing to estimate causal findings. In addition, as a follow-up study, *Chapter 4* extends *Chapter 3* and can thereby better determine the relationship between mobility intentions and subsequent behaviour. However, the results of this *Chapter 4* suggest that following the same sample over a longer period is advisable for further research. Two years are not always enough for graduates to realise their (im)mobility intentions. The time needed to complete one's education as well as to plan and realise one's move can differ from respondent to respondent. In line with the geographical focus in *Chapters 3* and *4*, I encourage more investment in longitudinal cross-border data. This will, among other things, support the deeper (labour market) integration of cross-border cooperation. I see this as a task for governments, companies, and universities to cooperate and invest in data to better understand the (im)mobility behaviour of prospective and recent graduates in the EMR, thereby also allowing more detailed analyses per sub-region. Such data can ideally be merged with geographical data, as done in *Chapters 2* and *5* of this dissertation. With regard to EMR, much work has recently been done on developing cross-border data. For example, with the support of Interreg funding, open access to cross-border data with information on the labour market, economy, and society

has recently been launched. Similarly, a project on cross-border data regarding a housing observatory in ERM has begun. Lastly, with regard to *Chapter 5*, panel data measuring personality traits over time can support a better understanding of the extent to which personality traits affect or are affected by the environment. The data can also support a more people-based approach in policy, because policymakers will better understand the dynamic interactions between different types of people and the living environment, and therefore better grasp the attractiveness of regions.

Place-based research and different geographical units

A context involving a specific place and people is relevant to a more holistic understanding of the research issue, since every region is unique and differs in its composition. Accordingly, I suggest that further research should focus on multi-level interactions between different geographical units, such as a combination of the neighbourhood level, the municipality level, and functional economic areas. This will add to a deeper understanding of the research issue at stake. In addition, such research will be able to better inform and analyse (spatial) policies in a more concrete context, because it allows for spatial differentiation, thereby also supporting a better understanding of how, for example, to distribute financial support from (local) governments to places.

Multidisciplinary and interdisciplinary approach

I encourage further research to take both a multidisciplinary and an interdisciplinary approach. I believe that the assets of different academic disciplines and professionals provide insightful information and encourages future research questions. The collaboration with different stakeholders, such as different companies and businesses, real estate parties, universities, and (local) governments, in *Chapter 2* is a good example.

7

Valorisation

7.1 Introduction

This dissertation intends to create more insight into the various factors involved in better understanding the attractiveness of places and the ability of places to attract and retain (new) residents. The research findings of this dissertation can be used as inspiration for policymakers concerned with the spatial and economic development in a region, human resources (HR) departments aiming to attract (international) personnel, and higher education institutions and policymakers in regions that would like to retain and/or attract (prospective) graduates. The research findings should offer a relevant contribution to the ongoing discussions on the (regional) competition for attracting and retaining (new) residents. Using scientific evidence as a contribution in policy design is not self-evident, and vice versa. The integration of scientific evidence, policy, and practice with each another will support a more holistic perspective. I wanted to address topics that are societally relevant by focusing on issues that are high in regional, national, and European policy agenda priorities. In doing so, my colleagues and I have also been involved in activities beyond the scientific domain. This section discusses several recommendations resulting from this dissertation for regional policymakers (Chapters 2 to 5), HR departments (Chapter 2), and higher education institutions (Chapters 3 to 5) and gives an overview of its contributions to policy and practice.

7.2 Living preferences of science, technology, engineering, and mathematics (STEM) workers in a peripheral region (chapter 2)

The research findings of chapter 2 show that the living preferences of STEM workers are often characterized by a suburban lifestyle in contrast to what much of the (spatial) policies imply.

The urban milieu has become a dominant area of policy and the mainstream approaches to spatial planning are based on growth-oriented paradigms, leading, for example, to social and spatial inequality. For the Netherlands, for example, there is, on the one hand, an economic policy introduced in 2011 (*Top Sectoren*) that stimulates R&D activities across nine key sectors (e.g. chemistry and creative industry), with these sectors being unequally spread throughout the country. On the other hand, the government wants to maintain the liveability in places that face demographic shrinkage or in places that are expected to decline (e.g. *Actieplan Bevolkingsdaling* introduced in 2009). This may make growth-oriented approaches inherently disruptive (Bock et al., 2019; Ministry of the Interior and Kingdom Relations, 2016). It is advisable to create synergies between growth and inclusion and to focus on alternatives to growth-oriented (economic) approaches (e.g. people-based approaches). In addition to the

dominant focus on the urban milieu, I furthermore encourage to take into account the attractiveness and demographic composition of different geographical clusters (i.e. rural, suburban and urban areas) and for different (sub)-groups.

Different companies and businesses, real estate parties, universities, and (local) governments should continue working together to create an attractive living environment, a well-functioning housing market, and a stronger and sustainable knowledge economy. The collaboration with different stakeholders in Chapter 2 is a good example. I recommend involving different stakeholders, from idea generation to project preparation, development, implementation, and evaluation. Working towards a common goal can be challenging, since stakeholders tend to have multiple priorities, their own objectives, and different perspectives. Clear project expectations and effective communications (listening, asking questions, reflecting, giving and receiving feedback) are key to keeping everyone in the loop.

I recommend that HR departments, local governments and institutions (e.g. the Expat Centre Maastricht Region) guide and welcome newly recruited (international) personnel in offering and arranging issues such as registering to a municipality, cross-border living, tax payments, health care insurance, toddler pre-school, day care for children, facilities such as sports and supermarkets and employment opportunities for partners. It is important that one is aware of one's own perception and reference point in advising others as one tends to be predisposed to attributes one values him or herself. There are many opportunities to guide and welcome newcomers, such as 1) creating a survey for new employees which can directly suggest places of residences, neighbourhoods and dwellings to live in based on their preferences or 2) creating a guide or app for newcomers with relevant information regarding working and living in the respective municipality (see for example mymaastricht.nl).

Companies and local governments can invest in newcomers for the long term (i.e. regardless of the length and type of the employment contract, keep track on how they are doing during different periods). For example, HR practitioners could plan regular meetings, and local governments could invite newcomers to such meetings to reflect upon their experiences living in the respective municipality and to meet other newcomers (i.e. encourage personal attachments to the region). Note that the creation of such a welcoming culture does not necessarily guarantee that newcomers will continue to live in the area in the long run. It should rather be seen as the creation of a positive experience, which is marketing in itself. In addition, HR practitioners can explain the work culture (work–life balance) in the company and involve current employees in welcoming their new colleagues (e.g. encourage them to be open to meeting newcomers after working hours as well, i.e. encouraging personal networks).

7.3 (Prospective) graduate (im)mobility intentions and subsequent behaviour in the Euregio Meuse-Rhine (chapter 3 and 4)

Chapter 3 and chapter 4 suggest that (im)mobility intentions and their realisation are caused by a combination of different factors.

(Im)mobility intentions and the realisation of it is caused by the interplay of different factors (e.g. hard and soft locational factors, social factors, individual factors, unexpected events etc.). It is advisable that policies to attract and/or retain recent graduates also focus on factors other than hard locational factors (e.g. employment opportunities).

(Im)mobility intentions which are formed while studying are a good predictor of actual (im)mobility behaviour. It is therefore advisable to inform students about opportunities (e.g. career, social and cultural opportunities) in the region already at earlier stages. I see this as a collective task for higher education institutions, policymakers and companies.

Prospective students and graduates can be encouraged to settle down in the study region. One suggestion is to provide attractive and affordable housing for students. Furthermore, higher education institutions can encourage their Bachelor's students to continue studying at the same university. The longer they live and study in the region, the greater their 'regional familiarity' becomes and the more likely they are to stay after finishing education. In addition, higher education institutions and employers can take a pro-active role in encouraging and offering (prospective) graduates (including PhD candidates) an internship, traineeship, student jobs or employment after graduation. From this perspective, (prospective) graduates gain access to networks and information about employment opportunities in the study region which increases the probability to remain living in the study region.

(Prospective) graduates do not always consider living and/or working across the border. It is important to invest in cross-border events to create platforms where people meet, interact and share their knowledge, ideas and culture. Institutions of the European Union have placed a great deal of importance on cross-border cooperation (see Hooijen et al., 2017, p. 2213). I encourage that higher education institutions, partner regions in the EMR and other stakeholder should cooperate and support future research on (im)mobility behaviour of (prospective) graduates.

7.4 Personality traits and their interaction with environmental factors (chapter 5)

In addition to the role of economic factors in explaining location choice among recent graduates of Dutch universities of applied sciences, Chapter 5 finds that

personality affects the perceived attractiveness of environmental factors and therefore also influences location choice. If people settle down in places that also fit their personalities, the strategies for attracting certain types of people to places should additionally focus on the alignment between psychological traits and environmental characteristics. Further research on this topic has the potential to inform policymakers and employers concerned with developing programs to attract and retain different groups of people. For example, it is important to not attempt to attract people scoring high on introversion through policies that promote a vibrant, busy, and social atmosphere.

7.5 Sharing of overall knowledge

The results of this dissertation are instructive for policymakers, companies and higher education institutions who aim to better understand the attractiveness of places in terms of attracting and retaining (new) residents, as it clarifies how different groups of individuals reason and act when making (im)mobility decisions and location choices.

I encourage a holistic perspective in a place-based approach that responds to the specific needs of the individual (or family) and local labour market, taking into account the national policy framework. I advise cooperation among different stakeholders and support longitudinal research projects so that their approaches and potential implementation can be more effectively analysed.

Note that the dissemination activities from other stakeholders who are involved in the projects discussed in this dissertation, are also listed below, to give a better overall overview of the societal contribution.

7.6 Distribution and dissemination of own and directly related research results:

Chapter 2: Living preferences of STEM workers in a peripheral region

Bussel van, M., Denissen, C., Muskens, B., & Kuijpers, A. (2016). *Je zal er maar wonen. Ontwerpend onderzoek naar huisvesting van kenniswerkers in een krimpregio*. Stein: buroStUB. Retrieved from http://kenniswerkersinlimburg.nl/wp-content/uploads/2016/06/Rapport_KenniswerkersinLimburg_BuroSTUB.pdf

Hooijen, I. (2015). De aantrekkingskracht van Zuid-Limburg. Retrieved from <http://www.vanmeernaarbeter.nl/blog/de-aantrekkingskracht-van-zuid-limburg>

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Hooijen, I., & Cörvers, F. (2020). *Living preferences of STEM workers in a high-tech business park of a peripheral region*. Research Centre for Education and the Labour Market. ROA Research Memoranda, No. 007 doi:10.26481/umaror.2020007

Autonomy. (2015). Knappe Kop. Kans voor Krimpregio. *Dagblad De Limburger / Limburgs Dagblad*.

Autonomy. (2015). Ook enquête Océ. *Dagblad De Limburger / Limburgs Dagblad*.

Province of Limburg. (2016). *Structuurvisie Wonen Zuid-Limburg*. Maastricht: Province of Limburg.

Chapter 3 and 4: (Prospective) graduate (im)mobility and subsequent behaviour in the Euregio Meuse-Rhine

Hooijen, I., Meng, C., Reinold, J. (2020). Be prepared for the unexpected: The gap between (im)mobility intentions and subsequent behaviour of recent higher education graduates. *Population Space and Place*. doi:10.1002/psp.2313

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Hooijen, I. (2019, July 3). Het Maastricht Syndroom. Retrieved from <https://www.neimed.nl/nl/blog/het-maastricht-syndroom>

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Planthof, S., & Thewissen, P. (2019, March 10). Studenten ook na studie in Maastricht houden. *De Limburger*. Retrieved from https://www.limburger.nl/cnt/dmf20190310_00095800/studenten-ook-na-studie-in-maastricht-houden

Workshops and presentations (chapter 3 and 4)

Settlement and mobility in the municipality of Maastricht. Students and recent graduates (Maastricht City Council meeting about the student city and student housing, March 2019).

Demographic composition in the EMR (Summer School for higher educated students in the Euregio Meuse-Rhine, Maastricht, the Netherlands, Institute for Transnational and Euregional cross border cooperation and Mobility (ITEM), September 2018). Together with Maja Ročak.

Students and border regions (Student Think Tank on “Opportunities for Students and Young Professionals Living in Border Regions”, Institute for Transnational and Euregional cross border cooperation and Mobility (ITEM) in cooperation with the Municipality of Heerlen, Heerlen, the Netherlands, May 2018). Together with Julia Reinold and Dionne van Oppen.

Students in the EMR (Annual meeting, Female in the Euregio Meuse-Rhine, Vaals, the Netherlands, March, 2017). Together with Julia Reinold and Inez Roosen.

Chapter 5: Personality traits and their interaction with environmental factors

Hooijen, I. (2020, April 9). Hou bij gebiedsontwikkeling ook rekening met persoonlijkheid. Retrieved from gebiedsontwikkeling.nu: <https://www.gebiedsontwikkeling.nu/artikelen/hou-bij-gebiedsontwikkeling-ook-rekening-met-persoonlijkheid/>

Hooijen, I., Bijlsma, I., Cörvers, F., & Poulissen, D. (2020). *The geographical psychology of recent graduates in the Netherlands: Relating environmental factors and personality traits to location choice*. Research Centre for Education and the Labour Market. ROA Research Memoranda, No. 001 doi:10.26481/umaror.2020001

Lukkezen, J. (2020, February 28). Wonen tussen geestverwanten. Het Financieele Dagblad. Retrieved from <https://fd.nl/futures/1335784/wonen-tussen-geestverwanten>

Sharing of overall knowledge:

Cörvers, F., & Hooijen, I. (2017). *Notitie voor de provincie limburg naar aanleiding van de workshop 'human capital and regional development'*. Maastricht: Research Centre for Education and the Labour Market. Retrieved from <https://cris>.

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Hooijen, I., & Reinold, J. (2018, October 16). Why not stay for another coffee and career? (F. Raith, Interviewer) Maastricht University. Retrieved from <https://www.maastrichtuniversity.nl/news/why-not-stay-another-coffee-and-career>

Went, E. (2018, May 24). Duurzaam aantrekken en inzetten van nieuwe Limburgers. Magazine on the spot. Retrieved from <http://magazine-on-the-spot.nl/limburgsearbeidsmarktdag/5-duurzaam-nieuwe-limburgers/>

Workshops and presentations (sharing of overall knowledge):

The attractiveness and DNA of Limburg (The Province of Limburg and the labour market, Roermond, the Netherlands, May 2018). Together with Julia Reinold.

Human capital in the region (Scientists day at Dutch Ministry of Social Affairs and Employment, the Hague, the Netherlands, October, 2017).

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Acknowledgements

It was the last weekend of August 2014 when I moved from Barcelona to Maastricht. Two days later, I started tutoring at University College Maastricht and I started my PhD journey at the Research Center for Education and the Labour Market (ROA), SBE, Maastricht University. Diving into the world of business and economics was completely new and fascinating to me.

The research projects in this dissertation are made possible with the financial support of the Graduate School of Business and Economics (GSBE) and ROA.

I thank my supervisors Prof. dr. Frank Cörvers and Dr. Christoph Meng for the professional and personal insights and the reflections I learned from them. Thank you, for letting me design my research projects in a way that suited me the best. Frank, I am very grateful for your dedication, sincerity, reliability, patience, and for your feedback. I am also very grateful for the many meetings we had together with other non-academic stakeholders and the conference on human capital and regional development we organized together in 2017. I always enjoyed and appreciated this a lot.

Many thanks to my colleagues at Neimed, Maja, Jol, Nol, Jan, Wim, Monique, Linda, Jos, Samira, Maurice and Marijke. Nol, thank you for your advice, interest in my research and for encouraging me to write an amazing introduction! I am always looking forward to our annual meetings. Thank you for making me feel so welcome all these years. I am very glad that we continue our collaboration.

Prof. dr. Mark Levels, Prof. dr. Ad Knotter, Prof. dr. Sabine Meier and Prof. dr. Eveline van Leeuwen, thank you very much for your time invested in assessing my dissertation and for your valuable feedback. I furthermore thank committee members Prof. dr. Melissa Siegel, Prof. dr. Jol Stoffers, Prof. dr. Gert-Jan Hospers and Dr. Katarina Wessling for their time invested in reading this dissertation.

I also express my appreciation to all my co-authors. I thank you for our collaboration, discussions and feedback. Julia, we have worked together a lot. I very much enjoyed working together on our EMR-studies. I really appreciate our shared dedication, interests, enthusiasm, laughter and all the days and evenings we worked together. I also really enjoyed all the presentations we did together in Vaals, Roermond, and Hannover. It was the presentation in Roermond where you presented in Dutch for the first time, you really did an amazing job! It would be great to be working together in the future again. Ineke, you are a person with true passion for your work. Your passion and enthusiasm for econometrics fascinates me. I have very much enjoyed

working together on chapter five of this dissertation. I am very grateful for the time you invested in explaining statistics to me. You always did it in such a fun and patient way. I also really appreciated our conversations, often together with Davey, about other things in life.

Doing a PhD was so much more for me than only doing research. Rolf, Frauke and Mark, it was a pleasure tutoring Theories of Social Order together at University College Maastricht for several years. Roxanne and Stefa, I was also very happy further developing and tutoring the Economics Sociology course together at SBE for several years. Kim, I really enjoyed tutoring Creative Problem Solving for emerging markets together. What a perfect team we were!

Karlijn, Swantje, Natasja, Zvezda, Victor and Julia, I very much enjoyed organizing the annual MACIMIDE conference in 2018 and 2019 together with you. It was always a pleasure to meet and work together with people from different disciplines.

I thank all my office mates, in chronological order, Paul, Marion, Frauke, Maria, Ingrid, Lynn, Bart and Alexander. It is often the case that you end up sharing the most time with your office mates. A special thank you also for my former third-floor colleagues, Arjan, Raymond, Ineke, Davey, Timo and Sander. Sander, a special thank you to you. What an amazing colleague you are. I am very grateful for your help with chapter two. Also, I still encourage you to become a tutor one day. I very much appreciate your kindness and our talks about life, hobbies and weekends.

I thank all my colleagues at ROA, SBE and the wider UM-community for the good talks and support. A special thank you for, in alphabetical order, Andries, Babs, Bas, Barbara, Burak, Cécile, Christian, Corrie, Diogo, Ehsan, Ibrahima,⁷⁶ Inez, Jaro, Johannes, Kars, Katarina, Lin, Madelon, Mariana, Marie, Marloes, Max, Mehmet, Mélanie, Melline, Nardo, Olivier, Per, Pieter, Sandra, Sergio, Tobi and Victor for all the conversations, writing days, lunches, dinners, coffees, teas and many other gatherings.

I express my gratitude to Esther, Mariëlle, Joyce, Melissa, Margo, Willeke H., Willeke K., Fleur, Silvana, Marion, Silvia and Miranda. Your support with, among many other things, administrative tasks, makes academic life much easier. A special thank you for Miranda for designing this book as well as for our conversations at the secretary on Friday mornings.

StudentenStad and team Match at Maastricht University, Martijn, Michelle, Winnie, Jacqueline, Hanna, Frits, Maurice, Thomas, Rick and Neal. I am extremely grateful to

⁷⁶ May his beautiful soul have been spread into this infinite universe.

have met you in 2020! According to me, you are one of the main actors playing a role in the decision of prospective graduates to remain living in this region. Keep up this good work!

I also thank team City Deal Kennis Maken Maastricht, Michelle, Nurhan, Herwin, Marlou and Simone. I only got to know you in the very last phase of my PhD trajectory. I am very happy to share our enthusiasm regarding urban development and hence the attractiveness of neighbourhoods.

Canims Merve and Seher, I am so grateful that we crossed paths. Arkadaşlığımız için çok teşekkür ederim! Thank you for your support, our gatherings as well as the writing days we spent together. Maria Ferreira, gracias por tu amistad. Eres una mujer muy fuerte, estoy orgullosa de ti! Charlotte, I am really happy that Julia introduced you to the writing days. Gracias por tu amistad. Espero que también nos encontremos en Ecuador algún día. Como pueden leer, “el curso de español esta dando frutos”. Julia, in addition to working together we also shared a lot of spare time together with our amazing group. Thank you for all these nice moments.

Kim and Sanne, my ROA musketers. I hardly remember any work-related social gathering where we were not with the three of us. Thank you for your continuous support, interest, the countless writing days and the many fruitful conversations we always have. Not only academically, but even more so on a personal level. Sanne, thank you for being such a wonderful friend. Kim, thank you for being such a wonderful friend too, regardless of being in Adelaide or in Nijmegen. It is very much appreciated.

Maja, we already met each other about a decade ago at the research centre Social Integration (CESRT), Zuyd University of Applied Sciences as well as during the alumni events of the MACESS. I am grateful that our paths crossed again at Neimed. I am thankful for all the writing days we had and still have in our home offices till date. Thank you for your continuous encouragements, advice, positivity, inspiration and hospitality. I value this a lot. Thank you for being an amazing friend.

Raginee, the first time we met was at the SBE end of summer BBQ in 2015. Several years later you joined the writing days. What a great choice that was! Thank you for all your support and your soothing energy! I am very grateful for the many walks and extremely interesting conversations we have. I am also thankful to often having each other as home-office mates. I would say that this new way of working in 2020 fits us rather well. It is great having you back in Maastricht for a few months, while France continues its lockdown. Humari dosti ke liye bahut bahut bahut shukriya. Humari dosti mere dil ke bahut kareeb hai.

Maastricht ladies, you power women, thank you for your continuous support, positivity, our many gatherings, honest and hilarious conversations and so much laughter. Thank you for your friendship. It truly means a lot to me.

I am grateful to have met so many wonderful people over the last years and to some amazing friendships that came along with it. Next to all these amazing people I have met during the PhD journey, I also take a moment to thank friends and family that played an important role in supporting me over the last years.

Thank you Janou, Bryan, David, Cinzia, Paloma and Jasper for having made living at the MBB even nicer! I felt blessed with you as neighbours. Janou and Philippe, I always appreciated your interest in my work. Thank you also for the unforgettable trip to Gibraltar. Paloma and Jasper, thank you for your joyfulness and encouragements!

Thank you to Marijn, Nel, Esther, Angela, Fab, Milou, Peter and all other friends from Limburg that are always there for laughs and good conversations.

Sevgili Mehmet abi, Arzu ve baba uzun ömürlü dostluğumuz için teşekkürler. Sanne ve Mavişle Van'a yaptığımız seyahatlerde ne kadar çok eğlendiğimi size ifade edemem. Van'da beraber olmak her zaman çok huzur vericiydi. Dürüst olmam gerekirse bu zamanlar Hollanda'daki hayati tamamen unuttuğum tek zamanlardı. Tabiki annem de ayrıca bizi meşgul ederdi. Allah rahmet eylesin. A special thank you to Mehmet abi. Abim, together with San we shared so many life events together over the last 20 years. Our friendship shows that distance does not play a part. Thank you for that.

Team levensgenieters, Alis, Wendy, Sophie and Sanne. Thank you, for your long-lasting friendship, our yearly surprise weekends and your true interest and support in my work. I am very grateful for this.

Sophie, Maviş, thank you for your continuous support in my life. You have played an important role during this PhD journey. I am also very grateful for our yearly trips to Mehmet abi. I wish that many more will follow!

Team zusjes, Jordana, Veronica, Sanne, Samirah, Evianne and Alis. I am so grateful to have you in my life. We have been through so many life events together. Thank you, for sharing all these moments. Thank you for your support and friendship. Samirah and Veronica, thank you for your warm welcomes every time we visit you in Malaga. Estoy extremadamente orgullosa de ustedes dos! A special thank you to Evianne and Alis, I enjoyed our weekends together in Maastricht a lot. I also appreciated your visit to my office in Maastricht as well as your interest in the academic conference in Cologne! Thank you, for your unwavering support. I feel blessed.

Begs, canim, yerim. How excited I was when I saw an unknown person walking with a Koç bag at the main square at UPF in Barcelona in 2013. We soon realized that we were classmates! You were the first to know that I got accepted to start a PhD in the Netherlands. You were so happy for me and at the same time we felt sorry as that also meant me leaving Barcelona. Ever since we kept on visiting each other, first in Barcelona and Maastricht and later in Istanbul. I am so grateful for all these amazing moments we spent together! I wish that many more visits will follow! Canim, iyiki varsin, thank you for your unconditional support, also in doing my PhD. Thank you for understanding my PhD journey so well. I also thank Nilgun and Resit for their warm welcomes in Istanbul. Eralp, canim, thank you for all the laughter and your curiosity to the Dutch culture.

Mum and dad, how grateful I am to have you in my life. I thank you for your unconditional love, support and advice. Thank you for your enthusiasm and interest in my research and for your curiosity in understanding the academic way of life. I feel blessed. A special thank you to my dad who forwards me newspaper articles related to my research projects almost weekly. I would have missed out on a lot of relevant information if he would not have done so!

Sanne, my dear sister, abla. Thank you for being a constant source of love and support in my life. Thank you for supporting all the decisions I take in my life. You truly are an amazing person and you mean the world to me. Thank you for always listening to me, for your advice and the encouragements. This is always very valuable to me. René, how grateful I am to have you as my brother-in-law. I thank you for your support and interest in my research projects, for Regional Capital and for life in general.

Me siento muy agradecida contigo, Domingo. Gracias también a ti, por tu amor, motivación, entusiasmo, dulzura y alegría constante que me ofreces. Tu apoyo y tu presencia significa mucho para mí. Te estoy muy agradecida, amor.

Undoubtedly, I can express my gratitude to other people I met along the way and are not mentioned here. Thank you for your support and insights.

Doing my PhD brought me so much more. I was naïve, not knowing what to expect from a PhD journey. I entered a ‘homo economicus’ world, which has been quite confronting at several moments. Nonetheless, it served as a great mirror to me and I am thankful for that. Doing my PhD has been a constant journey of self-reflection, dedication, inner believing, and trust. I am extremely grateful that I allowed myself to explore this side of me. Research may reveal many answers to research questions, yet the most significant answers in life are to be found within ourselves—something,

ACKNOWLEDGEMENTS

I wish, many more will explore regardless of the quest for reasoning in the rational world we live in.

December 2020

Executive summary

Most countries and regions are experiencing demographic change. Demographic change is driven by life expectancy, fertility rates, and the degree of the (im)mobility of people within and between regions and countries. The demographic structure and its development affect different fields in society, such as the labour market, the economy, the health care system, the pension system, and the environment.

Demographic growth and decline affect countries and regions in different ways. Regions facing demographic growth tend to have increasing labour productivity and tend to be more attractive regions, since more people are inclined to settle down in such areas, whereas regions facing demographic decline seem to fall further behind, with more ageing, a less educated population, and the departure of individuals with high human capital. The differences in regional demographic developments lead to an unequal distribution of the population between and within European regions. In the wake of unequal demographic development in European regions, scholars and policymakers are becoming increasingly aware of the diverse consequences related to demographic change.

As a consequence of disparities in demographic growth and decline, population (im)mobility has become increasingly important for expanding or maintaining the population, especially for local governments and regions facing a negative natural population change. In addition, knowledge has become an increasingly important determinant of local and regional development that results in increasing global competition to attract and retain people embodying this knowledge. This has encouraged many scholars and policymakers to better understand the determinants impacting these (im)mobility flows.

In the context of demographic challenges, the attractiveness of a place becomes more topical than ever when focused on attracting or retaining people. This dissertation intends to provide more insight into the various factors that are at play in better understanding the attractiveness of places and the ability of places to attract and retain (new) residents. In addition to an introduction, conclusion, and valorisation, this dissertation consists of a collection of four empirical studies written from an interdisciplinary perspective, including the application of mixed methodologies. The focus is on the following main research questions:

- Chapter 2: What are the living preferences of people with occupations in the fields of science, technology, engineering, and mathematics (STEM) in a peripheral region in the Netherlands?
- Chapter 3: What determines the (im)mobility intentions of prospective graduates to continue living in Euregio Meuse-Rhine after graduation?
- Chapter 4: What factors explain the gap between the (im)mobility intentions and behaviour of recent higher education graduates in Euregio Meuse-Rhine?

- Chapter 5: What role do personality traits play in recent graduates' location choice in the Netherlands?

Traditionally, it used to be thought that place attractiveness, especially in relation to the (im)mobility of people who embody knowledge (i.e. people high in human capital), was solely dictated by hard locational factors (e.g. employment opportunities and wages). Today, there is growing awareness that a more diverse set of assets is associated with place attractiveness. The studies in this dissertation show that various factors are at play in better understanding the ability of places to attract and/or retain (new) residents, by analysing the determinants of settlement behaviour.

Key findings

- Chapter 2: Much of the academic debate and policies imply that the majority of people with occupations in creative and knowledge-intensive sectors prefer to settle down in urban areas. However, the findings of the quantitative and qualitative analyses in Chapter 2 indicate that the average STEM worker seems to prefer a less vibrant lifestyle. The residential location choices indicate a suburban lifestyle, which is frequently characterised by green areas and open spaces, including a light touch of consumer amenities.
- Chapter 3: The results indicate that the (im)mobility intentions of prospective graduates in Euregio Meuse-Rhine are determined by students' perceptions of the quality of life, openness (i.e. ethnic diversity, tolerance, and ease of making contacts with locals), and career opportunities in the euroregion. In addition, distance to one's partner and other social ties, such as family and friends, influence (im)mobility intentions. Individual characteristics, particularly the place of birth and country, also play an important role in (im)mobility intentions.
- Chapter 4: The results indicate that location-specific capital impacts the realisation of the (im)mobility intention of prospective and recent graduates in Euregio Meuse-Rhine, as do other forms of capital, such as previous mobility experience and an internship during study. Furthermore, personality traits and unexpected events, such as a change in relationship status, influence whether respondents realise their initial (im)mobility intention.
- Chapter 5: The results indicate a distinct geographical clustering of personality traits among the different regions in the Netherlands. This geographical clustering becomes increasingly blurred as graduates age. The findings furthermore show robust associations between personality traits and several environmental characteristics (e.g. demographic development, economic viability, crime level). In addition, the results show that personality traits play a role in graduates' location choices. Even though economic factors seem to

have the largest impact on determining location choices, personalities play a role too.

The precise identification of what makes a place attractive is a complex task, for many reasons. Whether an individual perceives a place as attractive depends on subjective evaluations and different lifestyles and is affected by individual characteristics (e.g. age, gender, and level of education). Furthermore, the geographical level is important to consider when contextualising place attractiveness, since some evaluate the choice of a certain place on a local scale (dwelling, street, neighbourhood, municipality), whereas others evaluate their choice of an attractive place on a larger geographical scale (e.g. local government, region). This also highlights the need for a place-based focus, meaning that local, regional, and national governments are required to respond according to the specificity of a particular place, to develop a customised approach to the development of places (e.g. the development of local labour markets and personal networks).

Accounting for the relationship between 1) a politically defined geographical cluster (e.g. central, peripheral, border regions), 2) environmental factors (e.g. social, cultural, economic, and physical factors), and 3) individual experiences or collective processes (e.g. perceptions, subjective experiences, social relations, and interactions) in better understanding the ability of places to attract and retain (new) residents is a significant challenge.

Samenvatting (Dutch summary)

De meeste landen en regio's hebben te maken met demografische veranderingen. De demografische veranderingen worden beïnvloed door de levensverwachting, de vruchtbaarheidscijfers en de mate waarbinnen mensen mobiel of immobiel zijn binnen en tussen regio's en landen. De demografische structuur en de ontwikkeling daarvan hebben invloed op diverse terreinen in de samenleving, zoals de arbeidsmarkt, de economie, de gezondheidszorg, het pensioenstelsel en de leefomgeving.

Demografische groei en krimp beïnvloeden landen en regio's op diverse manieren. Regio's die met demografische groei te maken hebben, hebben over het algemeen een stijgende arbeidsproductiviteit en zijn over het algemeen aantrekkelijker regio's omdat meer mensen geneigd zijn zich in dergelijke gebieden te vestigen, terwijl regio's die met demografische krimp te maken hebben, verder achterop lijken te raken, met meer vergrijzing, een minder hoog opgeleide bevolking en het vertrek van personen met veel menselijk kapitaal. De verschillen in regionale demografische ontwikkelingen leiden tot een ongelijke verdeling van de bevolking tussen en binnen de Europese regio's. Wetenschappers en beleidsmakers zijn zich steeds meer bewust van de uiteenlopende gevolgen van deze ongelijke demografische ontwikkeling in de Europese regio's.

Als gevolg van de verschillen in demografische groei en krimp is de mate waarin de bevolking (im)mobiel is steeds belangrijker geworden voor de groei of het behoud van de bevolking. Dit geldt met name voor lokale overheden en regio's die geconfronteerd worden met een negatieve natuurlijke bevolkingsgroei. Daarnaast is hoogwaardige kennis een steeds belangrijker bepalende factor geworden voor de lokale en regionale ontwikkeling, met als gevolg een toenemende wereldwijde concurrentie om mensen aan te trekken en te behouden die deze kennis beheersen. Dit heeft veel wetenschappers en beleidsmakers ertoe aangezet om de determinanten van het (im)mobiliteitsgedrag beter te begrijpen.

De aantrekkelijkheid van een plaats wordt steeds belangrijker wanneer men zich concentreert op het aantrekken of behouden van mensen in tijde van deze demografische uitdagingen. In dit proefschrift probeer ik inzicht te verschaffen in determinanten die een rol spelen waarom bepaalde plaatsen wel aantrekkelijk zijn en wel het vermogen in zich hebben om (nieuwe) inwoners aan te trekken en te behouden. Dit proefschrift bestaat naast een inleiding, conclusie en valorisatie uit een verzameling van vier empirische hoofdstukken. Deze vier empirische studies zijn geschreven vanuit een interdisciplinaire invalshoek en maakt gebruik van zowel kwantitatieve als kwalitatieve onderzoeksmethodologieën. De nadruk ligt op de volgende primaire onderzoeksvragen:

- Hoofdstuk 2: Wat zijn de woonvoorkeuren van mensen die werkzaam zijn in technische beroepen (STEM) in een perifere regio in Nederland?

- Hoofdstuk 3: Welke determinanten spelen een rol bij de (im)mobilitéitsintenties van bijna afgestudeerden om na de studie in de Euregio Maas-Rijn te blijven wonen?
- Hoofdstuk 4: Wat zijn de factoren die de kloof verklaren tussen de (im)mobilitéitsintenties en het opvolgend gedrag van recent afgestudeerden in het hoger onderwijs in de Euregio Maas-Rijn?
- Hoofdstuk 5: In hoeverre spelen persoonlijkheidskenmerken een rol bij de locatiekeuze van recent afgestudeerden in Nederland?

Lange tijd lag de nadruk in veel onderzoeken over de determinanten met betrekking tot de aantrekkelijkheid van een plaats (vooral in relatie tot de (im)mobilitéit van mensen met veel menselijk kapitaal) voornamelijk op de zogenoemde harde vestigingsfactoren (bijv. baanmogelijkheden en lonen). Vandaag de dag is er een groeiend besef dat er diverse determinanten gepaard gaan met de aantrekkelijkheid van een plaats. De studies in dit proefschrift laten zien dat er verschillende factoren een rol spelen bij het beter begrijpen van het vermogen van plaatsen om (nieuwe) bewoners aan te trekken en/of te behouden door de determinanten van vestigingsgedrag te analyseren.

Belangrijkste bevindingen:

- Hoofdstuk 2: Veel van het academisch debat en beleid impliceert dat de meerderheid van de mensen die in creatieve en kennisintensieve sectoren werkzaam zijn, zich bij voorkeur in stedelijke gebieden vestigen. De bevindingen uit de kwantitatieve en kwalitatieve analyses in hoofdstuk 2 geven echter aan dat voor de gemiddelde bèta/technische werknemer een minder extraverte levensstijl de voorkeur lijkt te hebben. De woonvoorkeur die in dit hoofdstuk naar voren komen, duiden vaak op een suburbane levensstijl, die vaak wordt gekenmerkt door een groene omgeving, ruimtelijkheid en een bescheiden aanbod van voorzieningen en faciliteiten.
- Hoofdstuk 3: De resultaten geven aan dat de (im)mobilitéitsintenties van bijna afgestudeerden in de Euregio Maas-Rijn worden bepaald door de perceptie van studenten over de kwaliteit van leven, openheid (d.w.z. etnische diversiteit, tolerantie en het gemak van het leggen van contacten met de lokale bevolking) en carrièremogelijkheden in de euroregio. Daarnaast beïnvloeden de afstand tot de partner en andere sociale banden zoals familie en vrienden de (im)mobilitéitsintenties. Tevens spelen individuele kenmerken, met name de geboorteplaats en het land, een belangrijke rol in hun (im)mobilitéitsintenties.
- Hoofdstuk 4: De resultaten in hoofdstuk 4 geven aan dat locatiespecifiek kapitaal van invloed is op de kans om de (im)mobilitéitsintentie van bijna en recent afgestudeerden in de Euregio Maas-Rijn te realiseren, net als andere vormen van kapitaal, zoals eerdere mobilitéitservaring en het volgen van

een stage tijdens de opleiding. Verder zijn persoonlijkheidskenmerken en onverwachte gebeurtenissen, zoals een verandering in de relatiestatus, van invloed als respondenten hun aanvankelijke (im)mobiliteitsintentie realiseren.

- Hoofdstuk 5: De resultaten wijzen op een geografische clustering van persoonlijkheidskenmerken tussen de verschillende regio's in Nederland. Deze geografische clustering vervaagt naarmate de afgestudeerden ouder worden. De bevindingen laten bovendien sterke associaties zien tussen persoonlijkheidskenmerken en verschillende omgevingskenmerken (bijvoorbeeld demografische ontwikkeling, economische vitaliteit, criminaliteitsniveau). Daarnaast laten de resultaten zien dat persoonlijkheidskenmerken een rol spelen bij de locatiekeuze van afgestudeerden. Hoewel economische factoren de grootste invloed lijken te hebben op de locatiekeuze, spelen ook persoonlijkheden een rol.

Het is een complexe opgave om precies in kaart te brengen wat een plaats aantrekkelijk maakt. Of een individu een plaats al dan niet als aantrekkelijk ervaart, hangt af van subjectieve beoordelingen, verschillende leefstijlen en wordt beïnvloed door de individuele kenmerken (zoals leeftijd, geslacht en opleidingsniveau). Bovendien is het belangrijk om bij het contextualiseren van de aantrekkelijkheid van een plaats rekening te houden met het geografische niveau, aangezien sommigen de keuze voor een bepaalde plaats op lokale schaal (woning, straat, buurt, gemeente) evalueren, terwijl anderen hun keuze om een plaats als aantrekkelijk te beschouwen op een hogere geografische schaal (bv. lokale overheid, regio) evalueren. Dit benadrukt ook de relevantie voor een plaatsgebonden focus, wat betekent dat lokale, regionale en nationale overheden moeten handelen naar het unieke van een bepaalde plaats om een op maat gemaakte aanpak voor de ontwikkeling van plaatsen te ontwikkelen (bijvoorbeeld de ontwikkeling van lokale arbeidsmarkten en persoonlijke netwerken).

Een belangrijke uitdaging bij het begrijpen van de aantrekkelijkheid van een plaats om (nieuwe) bewoners aan te trekken en te behouden zijn: de relatie tussen (1) een politiek gedefinieerde geografische cluster (bijv. centrale, perifere ligging, grenspositie van regio's), (2) omgevingsfactoren (bijv. sociale, culturele, economische en fysieke factoren) en (3) individuele ervaringen of collectieve processen (bijv. percepties, subjectieve ervaringen, sociale relaties, interacties).

About the author

Inge Hooijen (1987) obtained her bachelor degree in Social Work at Zuyd University of Applied Sciences in 2010. She obtained her master degrees from London Metropolitan University (MA in Comparative European Social Studies) and Universitat Pompeu Fabra (MSc in Sociology and Demography) in 2012 and 2014 respectively. She gained national and international experience in practice and research previously to joining the Research Centre for Education and the Labour Market (ROA) as a PhD candidate and academic tutor in 2014.

She currently works at Maastricht University (StudentenStad, Match) as interim project coordinator for City Deal Kennis Maken Maastricht which is a project funded by the Dutch Ministry of Education, Culture and Science aiming to involve students, teachers and researchers in societal challenges in Dutch student cities.

She also currently represents Maastricht University in the Young Universities for the Future of Europe (YUFE) alliance for work package 6 which aims to build strong university-citizens communities that will address local and regional needs which will contribute towards solving European challenges and co-create a more cohesive society. YUFE is selected by the European Commission to develop and implement the first models for a European University.

Inge furthermore founded her own company in June 2020 named Regional Capital which is a consultancy for regional issues. The ambition of Regional Capital is to make regions more inclusive, more collaborative, more innovative and more sustainable. Regional Capital aims to form a bridge between practice, policy and science. The objective of Regional Capital is to contribute from an interdisciplinary perspective to the social and scientific debate on demographic and socio-economic regional issues.

She is currently involved for Regional Capital as a researcher in a project with Neimed (Socio-Economic Research Centre) for Regio Deal Parkstad Limburg. This project aims at improving the quality of life in the Parkstad Limburg region by, among other things strengthening the socio-economic structure. Regio Deal Parkstad Limburg is a large project funded by the Dutch and regional government. Inge is furthermore involved for Regional Capital as a researcher in a project together with colleagues from ITEM (Institute for Transnational and Euregional cross border cooperation and Mobility), Maastricht University, where she focusses on the cross-border labour market in the Euregio Meuse-Rhine before and during the Covid-19 crisis.

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